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# The Farmer's Digest


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# The Farmer's Digest

Volume 9 March, 1946 Number 11


## What The Cows Say About It

Condensed from Pennsylvania Farmer


*A. A. Borland*

Dairy Department, Pennsylvania State College


If you were a cow and were asked your opinion of the merits of a particular feed or a particular herd management practice, you would undoubtedly give the answer in one of three ways: yield of milk, gain or loss in weight, and physical well being.

A multitude of questions are constantly being put up to the herd at The Pennsylvania State College. The answers given by the cattle constitute a useful guide in many of the problems confronting dairy farmers.

The origin of the present herd dates back to 1889 when Dr. H. P. Armsby, the distinguished Director of the Experiment Station, started the herd with a number of grade Guernsey cows and a few pure-breds. Other breeds were later added by purchase or by gift of breeders, so that for 15 to 20 years a representative herd of each of the five major dairy breeds—Ayrshire, Brown Swiss, Guernseys, Holsteins and Jerseys—has been kept.

From the time the herd was started until the present, a period of 55 years, every milking of every cow has been weighed and a complete record of feed eaten has been kept. It has thus been possible to cull the herd on the basis of the individual record of each cow. Pure-bred registered bulls of productive ancestry have been kept at the head of each breed herd and properly balanced rations in kind and amount have been fed. By these means, which can be duplicated by dairymen through the membership in the local dairy herd improvement association and the co-operative bull association or the artificial insemination association, a consistent improvement in production has been attained. This increase and the average yield per cow at various times would have


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been considerably higher had it not been for certain experimental work which was detrimental to the yields of a number of the cows. The following table gives the average yields by 10-year periods for 55 years.

| Period | Pounds Milk | Pounds Fat |
|---|---|---|
| 1891 - 1900 | 4863 | 235 |
| 1901 - 1910 | 5329 | 266 |
| 1911 - 1920 | 6476 | 290 |
| 1921 - 1930 | 8608 | 348 |
| 1931 - 1940 | 9802 | 386 |
| 1941 - 1945 | 10434 | 437 |

From the first to the third period the increase was approximately 1,500 pounds of milk and 50 pounds of fat per cow. During the next 25 years the average milk yield increased about 4,000 pounds and the fat yield 150 pounds. The more rapid increase during the last 25 years has been due to greater freedom from disease, closer culling and the use of better bulls. The annual yield per cow has approximately doubled in 55 years and for the past five years has averaged 10,434 pounds milk and 437 pounds fat for 132 cows, including five breeds.

Some of the answers given by the dairy cattle in terms of milk yields, gains in weight and in physical well being will be of special interest to dairy farmers. For instance, the cows were asked, "What is the best stage of maturity of corn for ensiling?" They replied by way of the milk pail, "We will give you 8.6 per cent more milk on corn ensiled when medium mature (roasting ear stage) than when ensiled green (milk stage) and 16 per cent more milk from mature silage (grains well dented) than from green corn silage."

*Sunflower Silage* — Sunflower silage produced only 86 per cent as much milk as corn silage. A mixture of sunflowers and corn proved better than sunflowers alone, but even then the cows produced only 93 per cent as much milk as on corn silage.

*Clover Hay vs. Alfalfa Hay vs. Soybean Hay*—Cows fed good quality clover hay produced 94.5 per cent as much milk as those fed alfalfa hay. Soybean hay, properly harvested, was almost the equal of alfalfa hay for milk production.

*Pasture Fertilization*—The application of lime and superphosphate to DeKalb soil of moderate fertility gave the greatest milk returns per dollar invested in fertilizer, but lime and complete fertilizer gave the most milk per acre and the highest total returns above fertilizer cost.

On thin limestone soil deficient in humus, top-dressing with lime, fertilizer and manure gave poor returns, but when the ground was limed, manured, disked or plowed, fertilized and re-seeded, an excellent stand of pasture grass was secured.

*Pasture Management*—A comparison of top fertilized permanent pasture on Volusia soil with a crop rotated pasture gave striking results in favor of the latter plan. The pasture grass mixture seeded with oats in the spring included—orchard grass 8 lbs., timothy 4 lbs., meadow fescue 3 lbs., red clover 4 lbs., alsike clover 3 lbs., ladino clover 2 lbs.

The most striking feature of crop rotation pastures was the great increases in grass yield above that of the permanent pasture after July 15th when bluegrass usually becomes dormant. The grazed rotated pasture gave 113 per cent more herbage after July 15th than did the permanent pasture and the mowed and grazed plot gave 156 per cent more herbage after July 15th than did the permanent pasture. The rotation field mowed for hay before grazing yielded 3,100 pounds of hay per acre in 1944 and in addition furnished 70 per cent as much grazing as did the permanent pasture for the entire season.

*Crusher Mower*—While the feeding value of clover hay cut with a crusher mower was no greater than hay cut with an ordinary mower, yet the crusher enabled the curing of the hay 24 hours earlier than with hay cut by the ordinary machine.

*Grinding Roughage*—The digestibility of the total ration was found to be no higher with ground alfalfa than with unground hay. It would appear that increases in milk yields from ground roughage are not sufficient to pay the costs involved in grinding it.

*Vitamin A*—Calves on a ration deficient in vitamin A became unthrifty, developed a watery condition underneath the skin, and had frequent spasms. Some of them became blind, and others had defective vision in dim light.

The source of vitamin A is carotene, a yellow pigment in plants, which is converted into colorless vitamin A in the animal body. Cattle on good pasture or other green roughage never suffer from a lack of vitamin A. Yellow corn is the only grain feed that contains appreciable amounts of carotene. Hay cut early and cured quickly so as to preserve as much of the green color as possible is much higher in carotene than is bleached hay. Ensiling grass and legumes also preserves more carotene than when these crops are cured as hay. Cod-liver oil is high in vitamin A content and an ounce daily to new born calves for the first week or two has proved very helpful in getting them off to a good start nutritionally.

*Vitamin A and Cottonseed Meal*—Cottonseed meal has been accused of harmful results when fed in liberal amounts to young cattle. Yearling heifers fed from

four to six pounds of cottonseed meal daily for six months without green roughage developed symptoms of vitamin A deficiency. However, when given an ounce of cod-liver oil daily, a half pound of fresh carrots, or three pounds of choice early cut timothy or alfalfa hay of good quality, the heifers promptly recovered and subsequently displayed no symptoms of malnutrition, even though they consumed up to six pounds of cottonseed meal daily for ten months. They thrived and dropped normal calves six weeks after being taken off the experiment. Cottonseed meal can be fed in liberal amounts to dairy cattle, young and old, as long as good pasture, hay of green color or cod-liver oil is available.

*Rickets in Calves*—A surprisingly large number of calves kept in barns in the winter and not allowed out in the sun are affected to some extent with rickets. About 500 USP units of vitamin D per 100 pounds of live weight per day have been found necessary for the growth and well being of calves up to seven months of age. Sunlight is an effective agent in preventing the onset of rickets. Hence, calves should be out daily in the sun when weather permits. In winter it is desirable to supply an extra allowance of vitamin D to calves during the first few weeks of their lives. This can be done inexpensively by supplementing the ration with a half ounce of irradiated yeast per week.

*Partial Hay Curing in the Mow*—When hay has been partially cured in the field and the moisture reduced to 40-45 per cent, the finishing process may be effected by air forced through a series of ducts in the floor of the mow. By this means the moisture content of the hay is further reduced to 15-20 per cent in the final storage condition. Cured in this manner hay should retain its green color and carotene content to a high degree. Conditions to avoid are insufficient field curing before the hay is put into the mow and too deep a layer of partially cured hay put into the mow at one time. An eight-foot layer at one time is considered a safe maximum.

*Supplemental Minerals*—The three mineral elements most likely to be lacking in a ration are chlorine, calcium and phosphorus. Chlorine is necessary and should be supplied by allowing cows one to two ounces of salt daily, depending on the milk yield. Moderately high producing cows have been found by the Institute of Animal Nutrition to be able to satisfy their needs for calcium and phosphorus for milk production and the formation of a calf during the annual cycle of lactation, from either a timothy or an

alfalfa hay ration plus corn silage and a concentrate mixture, without supplements of calcium or phosphorus.

In feeding trials covering a period of ten years the "experimental" dairy herd was fed timothy hay, corn silage and a concentrate mixture containing 20 per cent of protein. Bone meal at the rate of two per cent of the grain mixture was fed on alternate lactations. All the cows were allowed to graze in the summer months. The results do not indicate an appreciable benefit from feeding the bone meal, as judged by milk production, reproduction or general well being.

*The Most Profitable Allowance of Grain to Feed a Cow*—Holstein and Brown Swiss cows were fed mixed hay and corn silage to supply their maintenance requirements and grain at rates varying from one pound of grain for 5.3 pounds milk to one pound of grain for 1.75 pounds of milk. It was found that cows fed grain at the most liberal rates produced about 12,000 pounds of milk yearly, while those fed grain at the minimum rate produced only about 8,000 pounds of milk yearly. Evidently the cow can largely adapt her output to the amount of nutrients supplied her. At the average wholesale price of milk and feed the highest net profit was made by cows receiving one pound of grain to 2.7 pounds milk. However, if the price of milk were higher than the average wholesale price of milk in Pennsylvania, then the cows fed more liberally than one pound of grain for 2.7 pounds of milk gave the higher net returns. No difference in health and well being of the cows resulted from different levels of grain feeding.

*Factors Conducive to High Milk Yields*—A study of 14 state institutional herds and a considerable number of privately owned herds showed that in the higher yielding herds nearly 70 per cent of the cows freshen in the fall and winter months. Close culling is practiced. A production standard is set for the herd. Cows are liberally fed. Disease is kept under control. And sires are carefully selected. The sire was found to be the most important factor in increasing the yield of the herd.

*Preserving Grass and Legume Silage*—From 40 to 80 pounds of molasses to a ton of green material results in excellent silage. However, molasses has been difficult to obtain. The use of 200 pounds fine ground corn and cob meal per ton of green alfalfa results in well-preserved palatable silage. Wilting the alfalfa in the swath to a moisture content of 60 per cent before ensiling without preservative resulted in good silage. Mixing 15 to 25 per cent of green sorghum forage with al-

falfa or soybeans also made a good quality silage. About five pounds of hay daily should be fed with grass-legume silage, otherwise the ration is likely to be too laxative. Feeding all the molasses-alfalfa silage the cow would eat in addition to five pounds of mixed hay, 25 pounds of corn silage and one pound of grain to six pounds of milk, produced 98 per cent as much milk as the same roughage fed with one pound of grain for each 3.5 pounds of milk.

*"Sulfa" Drugs for Calf Scours*—The "sulfa' 'drugs have been found very helpful in the treatment of calf scours and pneumonia in dairy calves when the treatment was administered by a competent veterinarian. Ninety per cet of the cases of calf scours treated with sulfasuxidine responded and 95 per cent of those treated with sulfaguanidine also improved.

*Pre-partum Milking*—A study of the effects of pre-milking cows from two to 16 days before freshening indicates that this practice helps to prevent udder congestion and mastitis. The practice is especially helpful with cows and heifers that show considerable congestion of the udder before freshening. Calves from premilked cows, if supplied with vitamin A to replace the high vitamin A content of colostrum milk, suffer fewer digestive disturbances than those from cows not premilked.

*Ground Buckwheat in Place of Corn Meal*—It was found that ground buckwheat could take the place of corn meal in the grain mixture without adversely affecting milk production, if the ground buckwheat did not constitute more than one-fourth of the grain mixture. Buckwheat middlings also replaced gluten feed without seriously affecting milk production.

*Oat Feed vs. Mixed Hay*—Growing heifers made slightly better daily gains on a mixed hay, silage and grain ration than on a similar ration in which oat feed was substituted in place of half the mixed hay. Over a period of 126 days the mixed hay group averaged 1.24 pounds gain daily, while the oat feed group averaged 1.16 pounds gain daily.

*Hominy Feed vs. Corn Meal*—White hominy feed and ground yellow corn was found practically equal for milk production in the ration of dairy cows.

*Raising Calves on a Dry Mixture*—Calves can be raised successfully on a dry mixture after they are five to seven weeks old. During the first three weeks of age they are fed eight to 10 pounds of whole milk daily. The amount is then gradually reduced until at the end of the seventh week no whole milk is fed. The dry mix is offered the calves when

they are one week old. A small amount of the dry mixture is put on the muzzle and into the mouth of the calf after it has finished drinking the liquid milk. In this way the calf soon develops a liking for the calf meal. The calf is allowed all the meal it will eat until it becomes old enough to consume up to five pounds a day.

*Artificial Insemination*—Field reports indicate that from 50,000 to 60,000 cows were inseminated artificially in Pennsylvania in 1945. Research work is being conducted to determine improved methods of preserving and handling bull semen so as to maintain its viability for extended periods of time.

The foregoing are only a part of the experiments completed or in progress. Most of the projects are in cooperation with other departments in the School of Agriculture so that as complete information as possible is obtained on each problem.

## Farming Partnerships

Based on a study of many years, farm management specialists recommend that special attention be given to several important points when working out partnerships, particularly those of father and son.

The Michigan State College farm management department stresses that most of the boys who return to the home farm from battlefields won't be content to work as hired men or unpaid family laborers. Rather, they'll wish to be taken into the business on a sound partnership basis.

Before deciding to form a partnership, it is wise to decide whether the partners and other family members can get along together, whether the business is large enough to support two persons or families, and whether adequate living quarters are available.

If the partnership includes two families, the business should be large enough to keep two men busy throughout the year, with a total gross income in normal times of from $4,000 to $7,000. At present operating costs, the gross income should be from $6,000 to $11,000.

The first step may be to increase the size of the business to the point that it will support two families comfortably. This can be done by renting or buying additional land, buying more feed and livestock, changing to more intensive classes of livestock, increasing the production of livestock per head, more intensive crop farming, developing special markets, and other ways.

—*Shorthorn World*

# We've Got to Have More Bees!

**Condensed from Farm Journal**

*John A. Rohlf*

FOR YEARS the bee men have been shouting warnings as to what would happen if we didn't pay more attention to bees. Now it has happened, and it hurts.

During the last two years we spent more than forty million dollars in subsidies to encourage production of legume seed. This seed was badly needed to increase livestock and dairy production, both here and abroad. Yet the results were discouraging. We got but a small increase. It wasn't because farmers didn't harvest larger acreages of legumes for seed, for they did, but rather because yields were so low.

A generation ago an acre of good clover would yield 12 bushels of seed. Today the average is less than one bushel.

Utah, one of our big alfalfa producing states, which 20 years ago marketed 24 million bushels of seed, produced less than 4 million bushels this year, although the seed acreage was about the same. It's like that nearly everywhere.

The reason is clear. We just have too few bees. There are at least fifty legume, vegetable, and fruit-bearing crops that need pollination, such as we get mainly from bees, if they are to set seed. Some on the list, particularly the vegetables, may surprise you. For example, onions, radishes, cabbage, carrots, and turnips need honeybees for a seed set. In Ohio, 25% of the farm land is planted to crops needing pollination.

Back in grandfather's day, you just weren't a real farmer unless you had a hive of bees. But as farming became more intensive and a farmer had less time to fuss with bees, they gradually disappeared. What a mistake those busy farmers made!

Wild bees used to be numerous, too, and they were important seed pollinators. But we have largely eliminated them by cutting timber, draining swamps, and farming up to the fence rows —their favorite hangouts.

More recently, bees and all other flower-visiting insects have taken a beating from insecticides, particularly the arsenicals. We still don't know for sure what widespread use of DDT will do.

Reprinted by permission from the Farm Journal, Jan., 1946, Philadelphia, Pa.

What can you do about bee pollination on your farm? Here are four ideas:

1. Buy some bees and take care of them yourself. (Re-read those words "take care.")

If you don't have a large place, chances are good it will pay you to operate your own apiary. You'll have plenty of honey for home use, and undoubtedly a ready market for extra honey and beeswax. The pollination service (the biggest dividend you'll get) is tossed in extra. A neighbor who raises bees or your County Agent are good men to talk to if you're new at bee-keeping. Your state college has helpful bulletins.

2. Rent colonies from a bee-keeper during blooming season. Many orchardists cheerfully pay $3 to $5 a hive to get bees. When you rent bees you are obligated to time your spray schedules so the bees aren't poisoned. With fruit, for example, the pollination comes shortly *before* the honey crop of the year. A bee-keeper can't risk losing bees through carelessness of the grower.

3. Buy package bees from the South and release each year. The idea is to use the bees solely as pollinators, chalking up the expense to increased seed or fruit. You provide no special hive, get no honey.

The Canadian government, long aware of the place of bees in seed production, buys and distributes packages of bees to farmers who place them near clover fields.

4. Induce a bee-keeper to move bees to your farm, by offering a choice spot near an abundant pollen source. He has to get his bees located somewhere; and if you have the right place, your chances are good. (He may even give you some honey.) Whether you have to pay rental will depend largely upon the local demand for honey-bees.

You may find a bee-keeper reluctant to move his hives, because of danger of American foul brood. A good bee man can control the disease of his own location, but runs a risk if he transfers to a new spot. Don't blame him.

Regardless of how you get the bees, a few strong hives will increase the seed crop of your legumes, vegetables, and fruits. You can't afford to pass up that bet.

# Sharecropping – New Style

**Condensed from The Nation's Agriculture**

***Tom Pearsall***

IT MIGHT be well for those seeking a solution to the age-old farm tenancy problem in the south to take a long look at the 22,000 acre Braswell estate in North Carolina.

Founded in 1868, the huge plantation was operated on conventional lines until ten years ago, when it came under the management of Tom Pearsall, a young lawyer in Rocky Mount, who had a deep interest in farming.

Two years after assuming the heavy responsibility of management, during not-too-prosperous times, Tom Pearsall had come to two conclusions, namely:

1. The old system was not good for the tenant.

2. The old system was not good for the owners.

With the consent of the owners, who were all members of Mrs. Pearsall's family, the new boss man began to make changes.

He did not abolish the sharecropper system.

He did make changes designed to bring about better understanding between owner and tenant. He wanted to cut down the costly and wasteful annual migration of nearly one in four Braswell negro tenants to other farms. He was convinced that good tenants would want to stay indefinitely if they knew they were better off where they were.

He hired superintendents who knew farm technology and farm management, and who had the knack of teaching what they knew to sharecroppers. In doing this he made available without cost, to every tenant, the best management skill that he could find.

No new tenant was taken on until his record had been investigated, and no tenant was engaged until long conferences had cleared up every last detail as to responsibilities of each party to the agreement. Once the agreement was made, rigid observance of terms by both parties was insisted on.

Mr. Pearsall made it perfectly clear to each tenant that he was in the farming business—had no desire to be a banker or a storekeeper for the tenant. He preferred that the tenant "furnish himself — that is, supply his own needs from harvest to harvest.

Reprinted by permission from The Nation's Agriculture, Chicago, Illinois

If the tenant insisted on borrowing from the landlord, that was all right, too. He would "furnish" him at a fair rate of interest. The records of every item purchased at the company store would always be open for inspection, and he urged each tenant to keep his own record, and to come in at any time to compare them with the company books. He was trying to establish mutual trust and confidence between landlord and tenant — the first essential in improving the landlord-tenant relationship.

Incentives for superior achievement were set up. Tenants soon realized that the man who did a good job need not worry about staying another year. If he took good care of the mules and equipment entrusted to him, he was fairly rewarded—not in money necessarily, but in terms of better equipment and buildings to help him do a better job of farming, and thus to improve the lot of his family.

The family is the natural unit on all cotton, tobacco and peanut farms. Success requires the cooperation of every member, large and small. (It will always be this way, in Mr. Pearsall's opinion.) The more than 1,000 negro men, women and children who operate the Branswell land assemble once a year for Achievement Day and a barbecue. Cash prizes are awarded for the five families which have achieved most during the season, along with 33 more prizes — "best tobacco farmer," "best peanut farmer," "best garden," "best care of milch cow," "largest number of units of canned fruits and vegetables," "best home improvement project," "best jar of canned tomatoes," and so on.

One of the best things he has done, Mr. Pearsall says, was to hire Miss Balmerlee Watson to work full-time among the families to teach the women and children home canning, needlework, nutrition, sanitation and home improvement in general. A canning plant was built, and every encouragement given for canning their own vegetables, fruits and even meats.

Almost all tenants keep one to three sows, so that little meat need be bought. Plans are afoot now for a central slaughter plant and cooling rooms which will eliminate the danger of spoiled meat.

Not all of the tenants keep cows, but many do. Electricity is being brought to the homes as rapidly as possible, and refrigerators for all are a future possibility. The aim is a live-at-home program that will enable each family to live better than they ever lived before at less cost. Plenty of meat, eggs, milk and canned goods—all produced at home. "We're just getting started

on this—there's more ahead of us than there is behind us," Tom Pearsall will tell you.

How much has already been accomplished? First, the annual turnover of tenants has been reduced from nearly 25 per cent to less than five per cent. Almost without exception, the tenants have automobiles. Ditto for radios. Average yield of tobacco has increased from 850 to around 1100 pounds to the acre . . . corn from 15-20 bushels to 25 to 40 bushels . . . cotton and peanut yields have been stepped up amazingly . . . production of meat and milk has gone up by leaps and bounds . . . nearly all tenants grow their own sweet potatoes . . . Few are without gardens, but the men have not been entirely persistent in caring for them, and now Miss Watson is trying to get the women and children to assume more responsibility for gardens. . . They canned in 1945 over 10,000 units (pints and quarts) of fruits and vegetables in the central cannery (no charge) and they expect to can 30,000 units in 1946, and possibly an equal amount in their homes. Mr. Pearsall wouldn't be surprised if Miss Watson makes a brilliant success of this project.

The home improvement program costs the tenant nothing except work, and no tenant has questioned it on the ground of company self-interest, because it brings no distinguishable income to the landlord, costs him heavily instead.

All of the innovations that Tom Pearsall has introduced have cost money, but he will tell you frankly: "It's the best money we have spent." He has found a way to make the much reviled sharecropper system satisfactory and profitable to both landlord and tenant.

# InCross Chickens

Condensed from New Jersey Farm and Garden

*Grif McKay*

THIS is to be a story about chickens — something very new and significant in poultry—but first let me tell you a short story about corn.

Corn growers used to go out into the field every fall and select seed corn from standing stalks, so as to observe the characteristics of the plant on which the seed ears were produced. This practice is now ancient history among corn growers, because, along in the twenties, hybrid corn came into the picture. Hybrid corn was the result of inbreeding different strains, then crossing these inbred strains to produce corn with more vigor and with definite growth characteristics.

Because of hybrid corn, the production of seed corn is no longer a job for individuals but for seed producers. In the principal corn states, practically all the corn raised is now grown from hybrid seed. Farmers have switched to hybrid corn because of higher yields, disease and pest resistance, etc., all of which in the final analysis means more money in pocket.

Do we face anything like this in poultry? The professors of poultry husbandry have been looking into the idea for years. One of the large producers of hybrid seed corn in the middle west has been working on the idea for several years, too.

The whole idea is past the experimental stage. There's proof of that statement in the monthly report of the Illinois Egg-Laying Contest. I have before me as I write the June report from that contest. Of the 50 pens of layers entered, three pens are labeled "InCross." Those birds are, to flockowners, what hybrid seed is to a corn grower. In fact, these very birds stem from breeding research with poultry, carried on by one of the producers of hybrid seed corn.

The production summary given on the June report shows that the InCross birds had outlaid all the standard breeds for the month of June and for the duration of the contest up to that time. During June, the InCross birds had a laying percentage of 62. The average of all standard breeds for the month was 41.1 per cent. The highest laying percentage of any standard breed was 46.4 per cent. That's considerably lower than the InCross figure.

For the duration of the con-

Reprinted by permission from New Jersey Farm and Garden, Dec., 1945, Sea Isle City

test, the InCross birds had laid an average of 160.8 eggs per bird. The average of all breeds for the same period was only 109.6 eggs. The best average for a pure breed was 120 eggs per bird.

Also, the best individual bird in the contest for that period was an InCross bird that laid 238 eggs which scored 253 points. The second high individual for the same period was also an InCross bird. The score of the high individual InCross layer was 20 points above that of the nearest pure breed layer.

Now, the Illinois records are not spectacular; none of the figures are exceptionally high, but the differences look as if they might mean something.

How are InCross birds produced? InCross chickens are not crossbreds. The chickens which are commonly known as crossbreds are the result of a simple cross between two breeds, or two lines of chickens which have not been inbred. For example, Barred Rock males and New Hampshire females result in a barred chick which is popular with broiler raisers in the East. This chick is a crossbred.

In producing InCross chicks, different lines are inbred for several generations, during which time brothers and sisters are mated, and rigid selection is practiced to get rid of undesirable characteristics, such as low egg production, poor livability, broodiness, etc. After a degree of uniformity is obtained in a strain, then unrelated inbred lines are crossed.

A few years ago I talked with some of the pioneers in production of Incross chicks, and one of the producers told me then that he had an incubator with capacity of 100,000. He had been selling some chicks for four years then. It is estimated that the production of InCross chicks hatched this year is around a half million.

At one of the mid-west colleges three years ago I talked with the poultry professor in charge of breeding work, and I learned that the college had eight lines or strains of White Leghorns and one of New Hampshires with which he was working. He told me that one of the difficulties the breeders have in incrossing is getting enough strains. He had tried to get a start with one strain from England, and had saved only two chicks. He remarked that when you have only several birds, say a male bird and two or three sister pullets, you had just as well not monkey with them.

Back of InCross chicks is inbreeding; no inbreeding, no InCross chicks. Some of the colleges have been carrying on work of this sort for quite a few years. Also, the U. S. Department of Agriculture is carrying on inbreeding work. All this is similar

to work which these institutions did for years in producing inbred lines of corn for combinations in producing hybrid seed.

How fast this trend toward In-Cross chickens will move, or how far it will go, is something nobody can tell. One thing is sure, though, it is something for breeders to watch and to learn all they can about it. If it develops anything like hybrid seed corn did with the corn farmer, flockowners and breeders will see things happen fast one of these days.

# A New Insecticide for Corn Borer

**Condensed from Farm Research**

*L. A. Carruth*
**Geneva**

A NEW insecticide which has been named "Ryanex" and is prepared from a tropical plant known to science as *Ryania speciosa,* has given highly satisfactory results when used either as a dust or a spray against the European corn borer in eastern New York and New Jersey for the past two seasons.

In preliminary trials against the corn borer in New Jersey in 1943, Ryanex was considered the most effective insecticide tested up to that time, even surpassing rotenone, nicotine, and other materials commonly used against the corn borer. In preliminary tests in New York in 1943, Ryanex produced a degree of borer control that was outstandingly better than that in nearby plots treated with other insecticides.

More extended tests in 1944 in both states against both generations of the corn borer showed that a 50 per cent Ryanex dust was more effective than previously used dusts containing nicotine and rotenone, except in one New York test where the degree of control was essentially the same as that produced by the later materials. Spray tests in New York indicated that Ryanex gave as good or better control than sprays containing rotenone.

Fifty per cent Ryanex dust applied to commercial plantings with power dusting equipment and with smaller dusters provided an excellent degree of practical control in New Jersey tests and in preliminary trials in New York. Fifty per cent Ryanex dust will cost about the same as one per cent rotenone dust and is expected to be available in limited amounts.

**Reprinted by permission from Farm Research, Geneva, N. Y., Jan., 1945**

# Successful Feeding of Sheep

Condensed from The Dakota Farmer

*Dr. P. R. Record*

ALTHOUGH grain and protein supplement feeding is essential for a successful sheep management program, sheep are primarily roughage consuming animals and are adapted to a system of pasture or range husbandry. The adaptations of sheep, however, because of certain anatomical characteristics, are limited to the consumption of short grass or succulent forage or soft, pliable, not-too-coarse roughage.

Sheep have a relatively high nutritive requirement because they often produce 10 percent or more of their body weight in grease wool and from 8 to 16 percent of their body weight in the form of lamb during a gestation period of 147 days. In addition to this, during lactation they produce milk of high protein and mineral content. Since these products are all high in protein and minerals, these two nutrients are of primary importance in sheep feeding.

In a well-planned program, pasture can be used as the basis of the feeding program over a large part of the year. Early spring pasture, that supplies short, tender, highly nutritious grass of high protein content, will supply practically all the nutrients required for satisfactory performance of the flock unless the pasture is overstocked. As the season advances and the grass becomes more mature, lower in nutritive value, and less palatable, it is necessary to use supplemental feeding unless other pasture of better quality can be provided.

In the late summer and early fall, grass pastures that have come back with cool weather and rains can again be utilized for a large part of the feed—or the sheep may be turned on wheat pasture, a practice quite extensively followed in some areas.

The sheep feeding program can probably be divided into two main classes, feeding the ewe and lamb flock and feeding market lambs.

The ewe flock can be maintained largely on pasture or dry roughage. If pasture or roughage is to be used as the principal part of the ration, it must be of high quality—otherwise supplemental feeding with concentrates is required. Good quality alfalfa or

Reprinted by permission from The Dakota Farmer, Dec., 1945, Aberdeen, S. D.

other legume is the most satisfactory dry roughage for maintaining the ewe flock, because, in amounts generally consumed, it usually supplies sufficient protein and minerals to meet the requirement of the ewe for these essential nutrients and supplies sufficient energy. However, when carbonaceous roughage is used, it is necessary to supplement the roughage with protein and mineral by feeding a concentrate of high protein content such as soybean oil meal and a high calcium mineral.

With carbonaceous roughages from 0.2 pound to ¼ pound daily of soybean oil meal per 100 pounds live weight will generally correct the average protein deficiency. A total intake of about 6 grams of calcium and 3 to 3.5 grams of phosphorus per day per ewe will be a satisfactory amount and in about the suggested ratio of 2 parts calcium to 1 of phosphorus.

During pregnancy, the ewe must be fed so as to maintain herself, produce wool, and supply the needs of the developing lamb. Legume hay may well be the basis of the ration of pregnant ewes. Corn silage is also an excellent roughage for ewes, but is deficient in protein and calcium and should be corrected by the use of about ¼ of a pound per head per day of a protein supplement such as 80 pounds of soybean oil meal, 10 pounds of finely ground limestone, and 10 pounds of salt. This type of feeding program can be followed until about one month before lambing, when the ewes should be given, in addition to the above roughage, about ½ to ¾ pound of grain per head per day.

Tests have shown that the development and vigor of the lamb and the vigor and milk-producing capacity of the ewe depend upon the kind and amount of feed the bred ewe receives. Bred ewes should be kept gaining in weight at a rate comparable to or slightly above the weight of the developing lamb and the increased weight of the fleece—a total increase during pregnancy of about 18 percent.

After lambing, the ewe produces a relatively large quantity of milk, high in protein and minerals. To do this she must be fed for this production. A feeding schedule similar to that followed during the last month previous to lambing, except that the grain allowance should be 1 to 1½ pounds per day, makes a satisfactory lactation feeding program.

The wool produced is largely protein and the nutrition of the sheep exerts a direct influence on the quantity and quality produced.

On the ranges in the western part of the country, sheep are maintained almost entirely on na-

tive forage. This forage is nutritious and can be grazed during winter, unless it is covered with snow, since it cures on the stem. This forage is carbonaceous in nature and should be supplemented with a protein supplement, such as soybean oil meal or pellets. Tests and actual feeding results have shown soybean oil meal pellets to be highly satisfactory as a supplementary feed for wintering ewes on range.

Both native lambs and western lambs are used in the corn belt in the production of market lambs. With native lambs, the market feeding program often starts before the lambs are weaned, by the use of creep feeding. In creep feeding, if the lambs are on pasture or have access to good legume hay, the feeding usually consists of keeping grain in the creep where the lambs have access to it at all times.

After weaning, the feeding practices for lamb feeding are usually the same for both types of lambs. As in the case of ewes, probably the most economical method of feeding lambs is the use of good alfalfa hay or other high quality legume hay and grain. If, however, high quality legume hay is not available and such roughages as timothy hay, straw, corn stover or silage are the roughage, then it is necessary to use a protein supplement such as soybean oil meal and a high calcium mineral with the grain.

The use of soybean oil meal as a supplement to an alfalfa hay, grain ration often results in increased rate of gain, the use of less grain per 100 pounds of gain, and a higher finish.

## Faster-Growing Trees

The time may come when trees can be grown in just half the time now needed to produce a tree crop. Dr. Earnest J. Schreiner of the U. S. Forest Service has bred hybrid poplar trees in Maine that grew six feet in one year. Others in Tennessee grew 10 feet in one year, about three times as fast as native poplars.

Faster-growing trees might make forest planting more profitable on cheap lands.

—*Farm Journal*

# Show Ring Versus Packer Buyer

Condensed from The Shorthorn World

*Dr. Carl W. Gay*
Ohio State University

THE fact that there is a wide spread between the condition of winning steers in the fat cattle classes and those meeting packer approval by topping the market or winning the carcass contest, usually packer judged, has bothered a lot of people for a long time. It even seems to some that the fitter for the show and the feeder for the market are working at cross purposes.

The difference in the condition desired by the show judge and the packer buyer is one of degree, the show steer being too fat and wasty for packer acceptance at top price. The packer knows that dressing percentage will be enhanced by the higher finish of the show steer, but he also knows that the actual cut-out value will be impaired because of the trim that will be demanded when the carcass goes over the butcher's block.

The point of contention seems to be that show standards should be revised in line with packer ideals, which, in turn, are subject to consumer demand. The argument is that if the cattle that win in the fat classes of the show are too fat to win over the rail or to command the packer's high bid, why carry them to such an advanced degree of condition? Not only is the ultimate product less valuable but the cost of production charged against the cattle would be materially reduced if this limited fattening was put into practice, since the last hundredweight to be put on is the most costly in the feed required to make it.

This argument is sound economically, but when one starts out to make cattle good enough to win, he seldom figures the cost or is influenced by economic considerations. Rather, he plans to win at all costs and omits nothing that will enhance, in any way, his chances of doing so. The higher cost, then is not on a logical basis for revising show standards. In the absence of other reasons for stopping the fitting process short of current ideals, besides those that the feed cost would be less and the packer would pay more, a consideration of the factors that have led up to the present

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standards of excellence in fat cattle as they are judged in the show-ring is in order.

The stock show is a competitive enterprise—just as much so as a horse race or a football game. The purpose of participants is to win and to this extent showing is an entirely different proposition from feeding for market. Attainment for the latter goal consists in obtaining the highest price paid but there is less distinction in this attainment than in winning in the show-ring, since several heads or lots may receive the same recognition. In the show-ring only one animal can be returned a winner and since the photofinish there are few dead heats even in horse racing.

This difference between show-ring competition and market price competition seems to be overlooked by those who cannot reconcile the descrepancy between show cattle and market cattle which we all know exists.

Not only is the show highly competitive in character but the competition is not so much between the cattle themselves as between the people who have made them—breeders, feeders and show men, the last two usually the same person. The breeder's successful work is credited when his cattle are picked for the show string to be fitted, so that from here the challenge is to the feeder. How can the merit of his achievement be measured and appraised in comparison with others, unless he goes the full course, so to speak. The fitter's job is to finish his cattle in the highest degree possible without incurring any evidence of unevenness or over ripeness and with just that bloom and touch that are so essential and may amount to the difference between winning and losing. Only the most successful and experienced feeders can get this job done and these master fitters are key men.

Comparative inspection of both winners and losers at almost any show will convince one that successful fitting has not only accounted for some of the most outstanding winners, but lack of it is responsible for others' failure to win. The relative merit of the men behind the cattle can be determined in no other way than by extending their efforts to the limit that cattle will fatten. And while it may seem to some that the men are outranking the cattle in importance in show-ring competition, how many times have good ones, potential winners, failed to win because they lacked some of the bloom shown by another beast admittedly not quite so good but better fitted.

Of course the fitter's opportunity is the product of the breeder and no skill in feeding can compensate for the breeder's failure. But given two calves of equal

promise and feeding capacity as determined by the breeder, and it becomes a feeder's battle. However, the best man cannot win unless he can demonstrate his superiority by fitting his cattle to the utmost.

Sure, this is not practical but that is beside the point. We are dealing with a sporting proposition. Two minute speed was not practical down the country road, through Main Street or in the Park in the good old horse and buggy days, but when it became necessary to settle an argument as to who had the best horse, it often required them to step that fast over the race track before the supremacy in question was established. We may condemn horse racing as impracticable but must admit it to be a rare sport. In the fat cattle competition, as in the horse race, practicability is set aside for the will to win and the contestants, like race horses, are sent to the limit.

Stock show reformers suggest that the shows would serve a more useful purpose if the market classes were judged on foot, slaughtered, judged in carcass on the rail and then the yield and cut-out value determined. No one questions the instructional value of such a procedure, and it is the only way to make a complete comparative study of the relative merits of too fat animals or their parents. However, such a question provokes some discussion as to just what the purpose of the stock show may be. Informational, to be sure, — no progressive livestock man wants to pass up an opportunity to learn more about his business. But shows are, as the name implies, for entertainment and inspiration. People attend to see good stock, and they take a sporting interest in the competition between exhibitors, especially if they happen to be acquainted with one or two of them. In addition, many a successful breeder has received his initial inspiration, which really led him into the livestock business, at the ringside.

Most of these people would lose all interest if they had to await a three day processing and calculation period before the winner was declared. The judging, slaughter, carcass placing and yield study had better be conducted by the experiment stations, some of which have made a start in that direction. Such a project might be a highly important source of much valuable information, but if the show is to be used as a medium for assembling such data, its more important functions of entertainment and inspiration would soon be defeated. Most shows depend upon attendance for their support and there would be little appeal to the ordinary show goer if he had to come back three or four days

later to learn the winner of a competition of which he had witnessed the first phase. Or he might have to read the final verdict in the newspapers.

That the show is not patronized as the place to settle relative merit in production is attested by the attendance at dairy cattle shows. It is well known that the only positive way to rate productive capacity of cows is by means of the test, yet people follow the exhibition of dairy cattle in competitive classes with the keenest interest, in spite of the fact that the decisions of the judges are no more accurate or equitable in expressing the contestants' relative worth, than are the judges' decisions in classes of meat animals. It is exactly the same with horses. The only absolute determination of which is the fastest horse is by comparing time trials, or, better yet, by sending a field of horses away from the wire in a race. Yet, who does not thrill to a show of road horses, even though the limited size of the show-ring may cramp their style of going compared with what they could do on the regular race track.

Webster defines a show as "A spectacle conducted for entertainment." Ask the people in attendance at the stock show, and they will tell you that Webster is correct. They came for entertainment, and they are getting it. Livestock makes a strong appeal to most people, and it constitutes the most attractive feature of almost any exposition. It is true that the group which derives the greatest real benefit from the stock show, even through not exhibiting, is the stock men themselves. And their special interests would be better served if they could study the killing sheets on all animals shown in the fat classes. But it is doubtful if the discrepancy between the prevailing system of judging and the more exhaustive determinations through slaughter tests and cut-out figures is great enough to warrant sacrificing the popular entertainment feature upon which the show is largely supported and which is a worthwhile purpose in itself. Anyway, as stated above, the accumulation of killing data is a research project which cannot be as well served by the show as by the experiment station.

Let those who take exception to what they believe to be a serious and misleading conflict of opinion and judgment consider thoughtfully the evolution of the stock show, i.e., the things that have made it what it is during the past half century and the things that are most likely to perpetuate it as an institution in the future. Such a study will reveal the stock show as a sporting event from which are derived thrill-

ing experiences in entertainment, inspiration and instruction. Its objectives may not square with the standards of packer demand, a business proposition, but probably it is a better show if they do not. The competitive element which gives zest to the entertainment feature, the battle of the show men as well as of the cattle, would be quite inconspicuous under the reform system.

# How Selective Cutting Paid Off

Condensed from Farm and Ranch

*T. F. Moore*

District Conservationist, Soil Conservation Service

WHEN a buyer offered $5,000 for all timber 8 inches in diameter or larger on his 100-acre woodland, J. P. Martin, who farms 500 acres in the Nacogdoches-Rusk Soil Conservation District, at first thought it a mighty good price. Particularly did he think so when he recalled that only five years ago he cut and sold 86,000 board feet from the woods.

But when he compared the $5,000 with the advantages in annual income and regularly increasing yields which the woods are producing under his conservation cutting plan, Martin, a member of the Texas State Soil Conservation Board, found that the buyer's bid was not even worth considering seriously.

A short trip with Emil Mueller, Soil Conservation Service forester assigned to the district, showed Martin that to accept the $5,000, even though it meant $50 an acre now while prices are high, would actually amount to taking money out of his own pocket for years to come. The offer would pay for only a fraction of the true value of the trees which measured 8 inches or larger. At the same time, the diameter-limit cut would put him out of the timber business for the next 40 years or longer, the very time when the trees he now owns would be producing their best yields.

Martin's farm has been under cooperative agreement with the soil-conservation district since 1941. The program designed to make the best use of each acre on Martin's place recommends that the woodlands be cut on a

Reprinted by permission from Farm and Ranch, Dallas, Texas, Dec., 1945

selective basis. Under that program, worked out with the technicians of the Soil Conservation Service, the 86,000 feet of timber was thinned from the woods in 1941, leaving behind a better, faster growing woodland than occupied the land before the cut.

The program on the Martin farm calls for continued thinning of the timber until it has the desired stand and for harvesting a tree—technicians call it a "crop" tree—from each acre every year. For economy, Martin is harvesting his woodland—thinning and cutting his "crop" trees — only once each five years. That means he will harvest five mature trees from each acre of his timber plus any trees which need thinning out in 1946.

When Martin went to his woods shortly after hearing the $5,000 offer, he and Mueller picked a representative spot and checked a fourth of an acre. "I would have guessed I had around three or four thousand board feet to the acre," said Martin, "but when we measured I found I had better than 8,000 feet an acre. When Mueller started using his tape on 8-inch trees, I was certainly surprised at what little fellows they were. Why , I couldn't afford to let anyone cut little trees like that."

He and Mueller estimate that the tree harvest under selective conservation cutting will amount to about 2,000 board feet per acre in saw logs.

If Martin does his own cutting in 1946 and delivers the timber to the mill as he did in 1941, he will obtain the current price of about $21 per thousand board feet, $42 an acre. That figure, he points out, is to be compared with the $5,000 or $50 per acre for stumpage, which he turned down. Instead of having almost a clear-cut after selling to an 8-inch diameter limit Martin can have four-fifths of the $5,000 in income during 1946 alone, plus a still excellent stand of growing stock in his woods.

Martin bought his farm in 1916, shortly after all the merchantable timber had been cut. Only a few seed trees and an occasional pine was left on the 100 acres at that time. Ten years later the stand had reseeded and was on its way to becoming good commercial timber. In 1925 the trees left when the cut was made about 1916 had grown enough so that 700 crossties were harvested, the first yield from the woods in ten years.

There was little or no other production from the timber during the next fifteen years. Martin cut a few saw logs for use around his home and a few fence posts; but in 1941, when the cooperative agreement with the Nacogdoches-Rusk Soil Conservation District was signed, the

woods had begun to produce. That was when the 86,000 board feet were thinned out.

The harvest plan on the woods, calling for thinning and cutting five crop trees from each acre every fifth year, is the way to make the most money from his woods, Martin is convinced. He expects to divide the 100 acres into 20-acre plots, one of which he can cut selectively each year. The division will distribute this work load better.

Selective cutting the conservation way is just sound business, Mueller showed Martin. The Soil Conservation Service forester pointed out that a pine tree which measures 10 inches in diameter after its first 30 years of growth, is worth only 20 cents at the current stumpage price of $10 per thousand board feet. But the second 30 years of growth, he stated, allows the tree to grow to a 20-inch diameter. That size tree is worth $3.44 at the same rate, or more than seventeen times as much as the 10-inch tree is worth. "In terms of a whole forest," Mueller said, "that means that the second 30 years of growth for the trees brings in at least seventeen times more income than the first 30 years."

"But just suppose," Mueller continued, "that the market drops. Suppose it drops lower than it ever has before and reaches $1 a thousand board feet. It still is worth more money to sell 20-inch timber in 30 more years at $1 per thousand board feet than it is to sell 10-inch trees at $10 per thousand now. The 10-inch diameter tree you now have contains only 20 board feet, but the 20-inch tree you can have in 30 more years contains 344 board feet, seventeen times more timber. You could get 34 cents for your trees in 30 more years at $1 per thousand board feet, and you get only 20 cents now for your 10-inch trees."

"You yourself," Mueller asserted, "will need the security, when you reach old age, that a continuously producing woods gives. And certainly you can make use of the income the 100 acres will yield from now on under conservation management methods."

Martin thins his forest by a simple method developed by Soil Conservation Service foresters. The method, available to any farmer at his local Soil Conservation Service office, provides the correct spacing to allow timber to grow at its maximum rate, allows for reseeding, develops one "crop" tree per acre each year for harvesting, and sets up a plan under which the owner schedules work regularly in his woods during the "off" season in the winter months or after laying-by time.

Trees aren't the only crop which Martin is handling the con-

servation way. Under his complete conservation program Martin has retired some pasture land on a steep slope to timber. There he has planted black locust trees for future use as fence posts and slash pine trees. The slash pine and locust trees were planted in 1938 and already a number of posts are available.

Thinning for posts can begin soon after the trees are set thus giving the farmer an early start at profitable use and management of his forest.

Crops on the Martin farm include cotton, corn, hegari for feed, and some watermelons and tomatoes. The latter two have yielded good profits on a 10-acre field during the past two years. Partly because of changes in land use and partly because of his conservation crop rotation, Martin's cotton yields have increased from 160 pounds of lint per acre to 260 pounds per acre since he has been cooperating with the Nacogdoches-Rusk Soil Conservation District. His corn shows a similar increase, although he has no figures on it.

"Handling this farm the conservation way—using crop rotations, contour terraces and terrace outlets, cutting my woods the selective way, together with a good many other necessary practices—is going to leave this farm a better place than when I got it," says Martin. "It's improving every year. If all my plans work out, and they are doing well now, there'll be a real going enterprise here, not only in a permanently producing woods but in ability of the soil to produce when I get ready to turn the reins over to someone else."

## Sweet Soil, More Corn

How much does it pay to lime acid corn land? Iowa farmers have found that it boosts corn yields an average of five bushels an acre. This is a 20-year average in tests conducted with the Iowa Experiment Station.

Although the corn plant is not particularly fussy as to the acidity of the soil, legumes are. Legumes don't deposit much nitrogen when grown in acid soil, and the corn yield suffers, later in the rotation.

—*Farm Journal*

# Boys Still Train Oxen in New England

Condensed from New England Homestead

*Joseph Callahan*

WHAT has become virtually a lost art to the rest of the country is practiced quietly in rural New England, where boy owners of prized oxen teams still train selected calves for the yoke. On most farms in other states oxen have been displaced by mechanized tractors and jeeps, but along our backwoods roads trained teams still patiently haul pulp wood from forest to farm under the direction of young masters.

A boy is either a natural born trainer who loves and understands his animals, or he isn't. His aptitude cannot be developed at any agricultural school because no courses in oxen training are offered. The boy is usually instructed by his father, grandfather or other older relative, but for the most part his instinct for handling calves so that they will do his bidding is a sort of inherited ability or talent. That this talent is not more widespread seems unfortunate because many a boy in poor physical shape has been made rugged by the healthy work of training and driving teams.

Teams have been used with only minor changes since Grecian times. The close bond between oxen and rural life was extended to the New World soon after the founding of Plymouth. An important shipment of the special cattle arrived from Devonshire, England, in 1624, consigned to the Governor of the Company of Massachusetts Bay. A second shipment of large yellow cattle came from Denmark, consigned to New Hampshire. There is a record a few years later of 100 head driven from New Hampshire all the way into the Boston market, where they sold for £25 per head.

Attention to training enabled early drovers to learn how to fatten winterfed bullocks by stall feeding, and as early as 1670 William Pynchon was sending regular shipments of fine cattle to Boston from his farm near Springfield. When the first Rutland Fair was held in 1852, exhibitors of trained oxen were allowed to travel to the Fair on any railroad in Vermont at half rate, and their animals went free. Since then specially trained oxen and their young owners have been seen at many fairs.

Today's oxen teams, however,

Reprinted by permission from New England Homestead, Dec. 22, 1945, Springfield, Mass.

are used chiefly for plowing, although they also haul some lumber and quarry products, especially in Vermont. Here a boy trainer takes a pair of small steer in hand almost from the moment of birth to prepare them for their teams.

The boy usually makes friends with each calf by getting the animal to lap warm milk from his finger. When the calf learns how to drink better by putting its nose in a pail, the boy gradually increases feeding rations, which are exactly like those fed normal calves—whole milk for the first four to six weeks, then skim milk or milk substitute, calf feed, sometimes mixed at first with warm water, and eventually a small portion of dry feed ration or calf meal placed in a clean box or container, perhaps with a little rye hay. Feed quantities increase with growth and age of the animal.

During the preliminary training period calves are usually handled individually. The boy takes a small twig or lash and "handies" the young animal with it by leading or manipulating until the calf understands simple directions.

When calves reach the age of about one month, they are paired according to size, color and adaptibility, and joined together by lead ropes placed usually about the head or neck. At this time the boy and his father or instructor may make halters, sometimes out of old leather straps. The calves are then taken out on the barn floor each day to be "handied" or taught to lead. They are trained with a whip or goad stick to follow more specific directions.

Although language with oxen varies greatly, the boy usually says "Haw!" to make the animal go to the left, and "Gee!" to make it go to the right. Other directions start the animal moving ahead or backward.

As soon as his pair have been taught to lead, the boy starts the difficult knack of training them for the yoke. A yoke of very light material is fastened to their necks with the bows loose under their throats. Small bridles, perhaps made out of old harnesses, are rigged up with light reins and the animals hitched to light vehicles where light draft is applied by using small loads. As the training period continues and animals grow, the yokes are changed to suitable size for the teams and the work they are to perform. When training is completed young animals can be driven by reins like older teams.

Some breeds of cattle "handy" much more readily than others because they are docile. These particular breeds make better oxen than other dairy breeds, which are often of nervous temperament, somewhat indifferent

to commands of their trainers. Holstein oxen, for example, are the equal of most breeds both in their capacity to train and to do faithful work.

Apart from private oxen teamsters who keep active the training tradition from one generation to another, New England has a few professional steer and oxen producers who own good strings of cattle.

## Something New in Nests

**Condensed from Kansas Farmer**

A NEW-TYPE laying-house nest, that will virtually eliminate dirty eggs, has been demonstrated successfully at Kansas State College, according to L. F. Payne, head of the poultry department.

Known as the "Compartment Nest," it provides 2 compartments, each 2 feet by 5 feet, and will accommodate 100 hens. The center partition can be left out if desired.

Five inches of litter are used in the nests, and hens cannot scratch out any of it because of the construction. The dark compartments, with entrances at the end, encourage pullets to begin laying in the nest, rather than on the floor. It is easily cleaned by lifting the nest off the platform base. Trapdoors make egg-gathering easy.

The compartment nest is easier and cheaper to construct than individual-type nests and takes less material. The platform on which it sits should be 2 feet above the laying-house floor.

In practice, hens enter at the end and seek a suitable spot in which to lay. Walking over the deep litter cleans their feet, and they do not pile up or scratch out the litter as in individual nests.

Here is what it takes to build one of these compartment nests: Ten 1 inch by 6 inch by 10 foot shiplap or T & G for sides and top; three 1 inch by 4 inch by 10 foot shiplap or T & G for sides and top; three 1 inch by 6 inch by 10 foot T & G for ends and partition; five 1 inch by 6 inch by 12 foot T & G for support platform; one 2 inch by 4 inch by 14 foot Y-P or fir for brackets; three 1 inch by 2 inch by 10 foot framing; 3 pounds of 6d nails for box; 1 pound 10d nails for box; four 4-inch hinge, top strap hinges; two 3-inch hinge, doors in ends; one half gallon creosote.

Reprinted by permission from the Kansas Farmer, Topeka, Kansas, Dec. 15, 1945

# DIRECTORY

## Purebred Livestock Registry Associations

**Reprinted from The Cattleman**

**Compiled December 1, 1945, by the National Society of Live Stock Record Associations, Union Stock Yards, Chicago, Illinois, Ellis McFarland, Secretary-Treasurer**

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American Brahman Breeders' Association, Hungerford, Texas, Mrs. S. C. Border, Secretary.

American Devon Cattle Club, Inc., Meredith, New Hampshire, W. J. Neal, Secretary.

American Galloway Breeders' Association, 840 Exchange Avenue, Union Stock Yards, Chicago, Illinois, Miss Margaret Coridan, Secretary.

American Hereford Association, 300 West 11th Street, Kansas City, Missouri, Jack Turner, Secretary.

American Polled Hereford Breeders' Association, 712 Old Colony Building, Des Moines, Iowa, B. O. Gammon, Secretary.

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### Dairy Cattle

American Guernsey Cattle Club, Peterboro, New Hampshire, Karl B. Musser, Secretary.

American Jersey Cattle Club, 324 West 23rd Street, New York, New York, L. W. Morley, Secretary.

Ayrshire Breeders' Association, Brandon, Vermont, C. T. Conklin, Secretary.

Brown-Swiss Cattle Breeders' Association, Beloit, Wisconsin, Fred S. Idtse, Secretary.

Dutch Belted Cattle Association of America, Buchanan, Michigan. R. E. Schwartz, Secretary.

Holstein - Friesian Association of America, Brattleboro, Vermont, H. W. Norton, Jr., Secretary.

### Draft Horses

American Clydesdale Association, 840 Exchange Avenue, Union Stock Yards, Chicago, Illinois, Miss Margaret Coridan, Secretary.

American Shire Horse Association, 319 E. 4th Street, Des Moines, Iowa, E. F. Fox, Secretary.

American Suffolk Horse Association, Spencer, Indiana, Ralph Poulton, Secretary.

Belgian Draft Horse Corporation of America, Wabash, Indiana, H. J. Brant, Secretary.

Percheron Horse Association of America, 9 Dexter Park Avenue, Union Stock Yards, Chicago, Illinois, Ellis McFarland, Secretary.

### Light Horses

American Albino Horse Association, Butte, Nebraska, Ruth Thompson, Secretary.

American Hackney Horse Society, Merrick, L. I., New York, Gurney C. Gue, Secretary.

American Quarter Horse Association, Eagle Pass, Texas, Mrs. Helen Michaelis, Secretary.

American Saddle Horse Breeders' Association, Inc., 120 S. 4th Street, Louisville, Kentucky, Charles J. Cronan, Jr., Secretary.

American Trotting Register Association, Inc., Goshen, New York, Charles E. Koons, Secretary.

Arabian Horse Club of America, 111 W. Monroe St., Chicago, Illinois, Alfred R. Watt, Secretary.

Cleveland Bay Association of America, White Post, Virginia, A. Mackey Smith, Secretary.

German, Hanoverian & Oldenburg Horse Association of America, LaFayette, Indiana, G. R. Crouch, Secretary.

Palomino Horse Breeders of America, Inc., Mineral Wells, Texas, Dr. H. Arthur Zappe, Secretary.

Tennessee Walking Horse Breeders Association of America, Lewisburg, Tennessee, W. P. Murrey, Secretary.

The Jockey Club, 250 Park Avenue, New York, New York, Joseph E. Davis, Secretary.

The Morgan Horse Club, Inc., 90 Broad Street, New York, New York, F. B. Hills, Secretary.

Morocco Spotted Horse Co-operative Association of America, Menlo, Iowa, LeRoy Fritz, Secretary.

### Ponies

American Shetland Pony Club, 4111 N. Sherman Blvd., Milwaukee, Wisconsin, B. K. M. Ryde, Secretary.

The Welsh Pony & Cob Society of America, LaFayette, Indiana, Miss Julia M. Wade, Secretary.

### Jacks and Jennets

Standard Jack & Jennet Registry of America, 501 Scarritt Building, Kansas City, Missouri, William E. Morton, Secretary.

### Sheep

American Cheviot Sheep Society, Inc., Oneonta, New York, Mrs. Katherine S. Turrell, Secretary.

American Corriedale Association, 1007 Sheridan Street, Laramie, Wyoming, Dr. F. S. Hultz, Secretary.

National Corriedale Sheep Association, 809 Exchange Avenue, Union Stock Yards, Chicago, Illinois, Mrs. F. J. Moline, Secretary.

American Cotswold Registry Association, 807 Exchange Avenue, Union Stock Yards, Chicago, Illinois, F. W. Harding, Secretary.

American & Delaine-Merino Record Association, Xenia, Ohio, Gowdy Williamson, Secretary.

Black Top & National Delaine Merino Sheep Breeders Association, Houston, Pennsylvania, I. Y. Hamilton, Secretary.

American Hampshire Sheep Association, 72 Woodland Avenue, Detroit, Michigan, Mrs. Helen T. Belote, Secretary.

American Leicester Breeders Association, Cameron, Illinois, A. J. Temple, Secretary.

American Oxford Down Record Association, Clayton, Indiana, J. M. McHaffie, Secretary.

American Rambouillet Sheep Breeders' Association, San Angelo, Texas, Bill Littleton, Secretary.

American Romney Breeders' Association, 200 Dairy Building, Oregon State College, Corvallis, Oregon, H. A. Lindgren, Secretary.

American Shropshire Registry Association, LaFayette, Indiana, Miss Julia M. Wade, Secretary.

American Southdown Breeders' Association, 212 South Allen Street, State College, Pennsylvania, W. L. Henning, Secretary.

National Suffolk Sheep Association, Middleville, Michigan, C. A. Williams, Secretary.

American Suffolk Sheep Society, Moscow, Idaho, C. W. Hickman, Secretary.

Continental Dorset Club, Hickory, Pennsylvania, J. R. Henderson, Secretary.

National Lincoln Sheep Breeders' Association, Marlette, Michigan, D. T. Knight, Secretary.

Karakul Fur Sheep Registry, Friendship, Wisconsin, L. K. Brown, Secretary.

### Goats

American Milk Goat Record Association, Sherborn, Massachusetts, Mary L. Farley, Secretary.

American Angora Goat Breeders Association, Rocksprings, Texas, Mrs. Claudine Hampton, Secretary.

The American Goat Society, Inc., 1514 Windsor Street, Columbia, Missouri, John P. Brox, Secretary.

### Swine

American Berkshire Association, 410 S. 5th Street, Springfield, Illinois, C. W. Mitchell, Secretary.

O. I. C. Swine Breeders Association, Goshen, Indiana, O. C. Vernon, Secretary.

Chester White Swine Record Association, Rochester, Indiana, L. P. Moore, Secretary.

Breeders' Chester White Record Association, 603 3rd Street, Des Moines, Iowa, L. W. Dreman, Secretary.

United Duroc Record Association, Peoria, Illinois, B. R. Evans, Secretary.

Hampshire Swine Registry, Commercial National Bank Building, Peoria, Illinois, E. M. Harsch, Secretary.

National Mule Foot Hog Association, DeGraff, Ohio, O. C. Kreglow, Secretary.

*American Poland China Record Association, 1 Dexter Park Avenue, Union Stock Yards, Chicago, Illinois, George W. Davies, Secretary.

*National Poland China Record, Winchester, Indiana, C. G. McCahan, Secretary.

*Standard Poland China Record Association, Maryville, Missouri, J. E. Rush, Secretary.

National Spotted Poland China Record Association, Bainbridge, Indiana, F. L. Obenchain, Secretary.

American Spotted Poland China Association, Moberly, Missouri, Van G. Sutliff, Secretary.

Yorkshire Swine Breeders Association, Valparaiso, Indiana, Harry Krum, Secretary.

National Hereford Hog Record Association, New Sharon, Iowa, A. W. Way, Secretary.

American Tamworth Swine Record Association, Ames, Iowa, W. T. Barr, Secretary.

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*These three Poland China Associations will be combined on or about January 1, 1946, and will be known as The Poland China Record Association, Galesburg, Illinois

# Resistance to Mastitis

Condensed from Guernsey Breeders' Journal

*Dr. James M. Murphy*
N. J. Agricultural Experiment Station

THE first instance of artificial immunization against an infectious disease in which the nature of the causative factor was known, and in which pure cultures entered into the preparation of the immunizing agent, is attributed to Pasteur. This was in 1880, and since that time artificial immunization has played a prominent role in the universal fight against disease.

Bovine mastitis was early recognized as an infectious disease, and it was only natural that many attempts at immunization should have been made. Among the earliest of such attempts were those of Reid in 1910 and of von Ostertag and Weichel in 1914. Soon, others became interested in this phase of the mastitis problem, and between 1925 and 1935, the study of artificial immunizaiton in bovine mastitis reached its peak.

There were many complicating factors in these studies, such as the scarcity of general knowledge of mastitis and the difficulty of controlling such experiments, but the most disturbing complication was the need to distinguish between *infection*, which causes mastitis, and *mastitis* itself. These problems were effectively dealt with by Seeleman in 1932, in what was probably the most comprehensive study of the subject ever undertaken. Experimenting with 1,640 cows in 13 herds over a period of several years, Seeleman finally concluded that vaccines were useless both as curatives and as preventives.

This today, although many still maintain that vaccines or bacterins of various kinds are helpful in the treatment of mastitis in the clinical sense, *there is no satisfactory evidence that a cow's resistance to infection of the udder can be raised by the use of vaccination or other immunization procedures.*

This does not mean, of course, that immunization is impossible —merely that we are not able to accomplish it at present. Above all else, the one observation that discourages an optimistic viewpoint is that the most careful studies fail to show that the natural occurrence of the disease

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confers any immunity. In fact, with the streptococcal form, which is the only form so far studied to any great extent, most investigators agree that the incidence increases with age. The reason for this has never been demonstrated but different explanations have been advanced, such as the greater chance for injury provided by each succeeding lactation period, increasing incompetency of the closing mechanism of the teat, the effect of hormones, and the necessity for prior sensitization. At any rate, if any resistance were acquired, the incidence of infection should not increase with age.

Sanitation and segregation have been stressed almost from the moment of the discovery that mastitis is, in the broad sense, an infectious disease. This means for controlling bovine mastitis is based upon the thesis that virtually all mastitis is caused by a specific germ, *Streptococcus agalactiae,* and that the only source of this germ is the infected cow. It is generally conceded today that *Streptococcus agalactiae* infection and mastitis can be eliminated from herds and that, theoretically at least, these herds can be maintained free from this form. But the sanitation—segregation method in the strict sense —requires a bacteriological diagnosis, which is usually costly and always difficult to apply over any large area and which, until recently, required the careful separation of the infected cows from the uninfected or their removal from the herd.

In spite of the cost of diagnosis and the difficulty of application, the sanitation—segregation method—has been applied in many herds with a certain degree of success. The cost of diagnosis was lowered (to the owner) either through the use of simplified cultural tests or by the adoption of free or low-cost testing services by some states. But because of the necessity to segregate permanently or to dispose of infected cows, the method was still a costly one until the advent of the various "treatments" as we know them today.

It is now possible to cure *Streptococcus agalactiae* infection in many cases, and this goes a long way toward overcoming the need for prolonged segregation or disposal of infected individuals. A larger degree of control should now be possible. But two points arise to complicate this picture. The first is that bovine mastitis, in the broad sense, is now recognized as due to several kinds of bacteria. More and more the assumption that virtually all mastitis is due to *Streptococcus agalactiae* is being abandoned and references to staphylococcal and coliform mastitis are becoming commonplace. Treat-

ments which were at first aimed only at *Streptococcus agalactiae* are now being directed at the other bacteria as well. But even if the ideal treatment—one equally effective against all these organisms—were developed, treatment itself brings up the second point: *treatment confers no immunity*. In fact, certain workers have even suggested that the mammary gland is more susceptible after treatment than before treatment. This theory has not been proved, but certainly a treated quarter is equally susceptible after treatment, and the fact that it was infected in the first place is evidence that it was susceptible.

If all *Streptococcus agalactiae* infections were cured or removed from the herd, and if, as is usually presumed, there were no other sources of this infection in the herd or its immediate environment, then we would have a herd free from *Streptococcus agalactiae*. But the treated quarters may be susceptible to reinfection with whatever organisms are present in the environment, and some of these are pathogenic. It should follow that *Staphylococcus aureus* and coliform bacteria would find their way into these glands and, under certain conditions, cause mastitis. Such has already been found to be the case with streptococci other than *Streptococcus agalactiae* and with *Staphylococcus aureus*, and such will very likely prove to be the case with the coliform bacteria.

Some of this difficulty can be attributed to the fact that we are trying to solve the problem from the wrong end. Instead of applying most of our research effort to the "how" and "why" of udder infection, we are striking at the disease after it occurs. It was with the thought that the proper approach to the study of mastitis is to observe a group of cows for a long period that the New Jersey Agricultural Experiment Station began its mastitis investigations in 1937. One of the objectives was to obtain lifetime mastitis and udder infection records on all individuals in the herd. Since the beginning of the study, 338 milking individuals have been under examination at one time or another. Complete lifetime records, dating from the time of first-calving, have been obtained on 211 individuals. Incomplete lifetime records, occasioned by the fact that milking-life began prior to the inception of the study, have been obtained on 127 individuals.

In order to utilize this enormous quantity of data, it was necessary to originate a method of assaying the infection history of the individual for each lactation period. The big problem here was that one or more of the four quarters of a cow may be infect-

ed during all or only part of a lactation period which covers a variable period of time. The difficulty occasioned by the variable length of the lactation period was overcome by dividing each period into thirds: first, middle, and last third. Inasmuch as each quarter of the udder was examined separately, there were then 12 divisions or 1/12's to each lactation period. Thus any infection existing during one 1/12th of a lactation period was equal to 8.3 per cent of the milking time. In this way it was possible to state the degree (duration) of infection during one or more lactation periods as the *percentage of the milking time occupied by infection.*

The immediate result of this method was to show that some individuals rated 0 per cent while others rated as high as 100 per cent. This was, of course, of great interest and, in view of the fact that most investigators agree that mastitis increases with age, an attempt was made to calculate a conversion factor by which to put all the records on an equal age basis. This failed, largely because the data at our disposal were not adequate, but it was observed that two families of pure bred Guernsey cows, almost equal in size and observed for almost the same length of time, were present in the herd. These two families existed at the same time, in the same herd, and were managed in the same way entirely as individuals whose family history was unknown to us until their records had been established.

The histories of these two families are most interesting. The ratings given are severe in that both streptococcal and staphylococcal infection are included. Nevertheless, five of six members of family 283 were rated *50 per cent infection or higher,* whereas six of seven members of family 247 were rated *20 per cent infection or lower.* Solely on a streptococcus basis, family 283 was infected during 24.0 per cent of 17 lactation periods, whereas family 247 was infected during 0.9 per cent of 19 lactation periods. Mastitis, as the disease produced by infection, was much higher in family 283 than in family 247. Milk production was almost equal in the two families: family 283 produced an average of 8580.4 lbs. of milk and 422.2 lbs. of fat, an average of 4.92 per cent fat; and family 247 produced an average of 8407.0 lbs. of milk and 445.0 lbs. of fat, an average of 5.29 per cent fat.

Although several investigators have attempted to show that heredity plays some part in bovine mastitis, no data yet presented approach the conclusiveness of the records of these two families. There now appears to be ample evidence to indicate that each in-

dividual has a certain resistance or susceptibility and that this can be transmitted genetically, at least to a certain degree.

Mastitis, then (and perhaps other animal diseases as well), appears to be at least partly a constitutional disease. But what is constitution? It is the sum total of an individual's characteristics as they are potentially determined at the moment of fertilization. This should interest the breeder of dairy cattle at once and should raise the question: How can individual constitution be measured? The answer is, that constitution itself is not measurable, but there is reason to believe that some of its components may be defined in exact figures. Unfortunately, we have not been able, with present facilities, to carry our investigation beyond this basic observation. It is hoped, however, that sufficient interest will be aroused to stimulate further study.

Temporarily, some estimate of the individual constitution can be obtained as the many obstacles to health are met and overcome during a lifetime, or as the individual's parents have met and overcome those obstacles. Stressing the importance of records of young cows, and the utilization of offspring of young cows as sires is, therefore, contrary to such principles. On the other hand, definite profit should be realized from the selection of bulls from sound old cows, or, better still, the selection of bulls from a known succession of sound old cows.

Certainly it is time that we stopped placing most or all of the blame for our disease troubles on the environment in which the dairy cow is raised and passes her life. It should be realized, in the case of mastitis, that the harmful influence of environment can only be minimized and that the cow herself must be partly responsible. By concentrating more of our effort on the study of the "how" and "why" of udder infection we should not find it too difficult someday to place a *good cow* in that good environment that we have gone to such great lengths to provide.

# More Eggs – Bigger Profits

Condensed from American Poultry Journal

*Fremont Conrad*

THE way to make more money feeding chickens is to make *more* of them lay eggs and made them lay *more often!* The faster your hens fill a case of eggs for you to take to town, the *less* feed and *more* profit you'll have in every case.

Feeding is believing. The bags of feed required to produce a case of eggs *go down* as the rate, or percentage of flock production, *goes up!*

Let's see how it pays to speed up egg production by feeding good hens in accordance with their laying ability.. If your flock production is 40%, that is, if only 40 hens out of every 100 lay an egg each day, it will take 9 days for those 100 hens to fill a case. That's a long time in anybody's laying house. And during those 9 days, they would eat 216 lbs. of feed!

Now suppose your hens were laying at the rate of 70%. Another glance at the chart will show that it would take 100 hens only 5.1 days to fill a case of eggs at that rate of production, and would consume only 153 lbs. of feed. If your flock does not average 4 lbs. in weight, Table 1 will show the feed investment per case for flocks of other common weights, at 40% to 70% production.

The figures on this chart are based on Feed Consumption Table 2.

This table makes ample allowance for the basic maintenance requirements of 100 hens weighing 4 to 7 lbs. each. It is a generous allowance to provide for the variations in climate and housing, as well as differences in temperament and activity of various breeds and strains. While maintenance requirements remain fairly constant, the amount of feed required for egg production must be in proportion to the eggs produced.

These allowances may seem higher than those commonly accepted in the past, but they are supported by many commercial poultrymen who find they cannot reach their peak in egg production unless these levels of feed consumption are reached and sustained. According to records of many commercial poultrymen, as well as feed consumption records of egg laying contests, approximately 2 lbs. of feed can safely be allowed for each 10% egg production. Here we have a prac-

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**TABLE 1**

**Feed Invested in Case at 40% to 60% Production Based on Feed Required by 100 4 to 7 lb. Hens**

| Rate of Production | 40% | 50% | 60% | 70% |
|---|---|---|---|---|
| Number of Days to Fill Cases | 9 | 7.2 | 6 | 5.1 |
| Feed for 100—4 lb. Hens | 216.0 | 187.2 | 168.0 | 153.0 |
| Feed for 100—5 lb. Hens | 234.0 | 201.6 | 180.0 | 163.2 |
| Feed for 100—6 lb. Hens | 252.0 | 216.0 | 192.0 | 173.4 |
| Feed for 100—7 lb. Hens | 270.0 | 230.4 | 204.0 | 183.6 |

**TABLE 2**

**FEED CONSUMPTION TABLE**

**Daily Feed Recommended for 100 Hens To Support Indicated Percentage of Production**

| Production 100 | 40% Lbs. | 50% Lbs. | 60% Lbs. | 70% Lbs. |
|---|---|---|---|---|
| 4 lb. Hens | 24 | 26 | 28 | 30 |
| 5 lb. Hens | 26 | 28 | 30 | 32 |
| 6 lb. Hens | 28 | 30 | 32 | 34 |
| 7 lb. Hens | 30 | 32 | 35 | 37 |

**To determine whether you are feeding enough feed to support the inherited egg laying ability of your hens:**

1. **Weigh enough hens in your flock to find their average weight.**
2. **Find your flock production by dividing the eggs laid by the number of hens. Example: 60 eggs divided by 100 hens equals 60% production.**
3. **Feed the amount shown where your WEIGHT and PRODUCTION lines intersect. Example: 100 hens averaging 5 lbs. and laying 60% should eat 30 lbs. daily. This should be your feed consumption goal in mash and grain.**

tical basis for feeding laying hens according to their egg production —just as successful dairymen feed their cows according to the milk they produce. The caption beneath the table will tell you how to determine how much feed your hens must have to bring out the egg production of which they are capable.

Of course, your potential egg production will depend on the breeding in back of your flock. That inherited egg-laying ability was determined when the breeding flocks from which your chicks were hatched were mated. It will depend also on the way you developed the pullets you got from those chicks and on the way you manage them in the laying house. Therefore, you cannot expect to lift a 40% flock to a 60% level of production just by feeding more feed. However, this plan will help you make certain that

your hens will receive enough feed to support the level of production of which they are capable. Then it will be up to you to keep up the rate of feeding indicated in the table, or your rate of production may go down.

For a long time, discussions of poultry feeding have stressed the quality of feed, and rightly so, for this is truly important. This discussion places equal emphasis on the right *amount* of feed as well as the right kinds. In a recent USDA survey of 30,000 farmers, it was found that one-third of the feeds fed to poultry was in the form of commercial mash. This indicates that poultry people are placing more and more confidence in the manufacturers of these formula feeds, knowing that they provide the complete nutrient requirements of their flocks through quality ingredients blended in proper proportions.

However, many poultrymen who have always fed the best feed they can buy will admit that they pay less attention to the amount of feed that is consumed. Grain and mash may not always be fed regularly, and in the course of a busy day, mash hoppers may not always be kept filled. This weighing program may bring a new chore, but it need not become a daily chore.

### Can Weigh Feed Once a Week

Once the average feed consumption is determined after a normal period of egg production, you may be able to keep your finger on the feed consumption of your flock simply by weighing the mash and grain consumed once a week. Then take a red wax crayon and mark the feed pail at the level you filled it on your feed weighing day. Watch that red line and hold it, because many a fall and winter molt can be headed off by avoiding the drop in consumption that undoubtedly preceded it.

How can you tell how much your chickens eat every day? Well, if you don't fill your mash hoppers too full — and they're built so your hens can't *waste* any feed, you can weigh what is left at night and subtract it from the amount you put in the hoppers in the morning. As for grain that is fed in the litter, the best way to tell how much to feed is to weigh out no more than the hens will clean up. Look carefully through the litter for any remaining grain. Don't let feed that is wasted fool you. It's not only uneconomical from the standpoint of the wasted mash or grain; it's bad for your business if your hens don't eat what you think they do.

What can you do when you notice feed consumption going down? Get busy right away to coax the appetites of your hens. Feed mash and grain more often during the day. Stir up the mash

in the hoppers. Place more hoppers around the laying house. Put a couple of shallow hoppers on the roosting platforms to help the more timid hens in the flock. Turn all hoppers in line with the source of light so they will be equally lighted on both sides. You never saw chickens scratching with their backs to the light. That's why they pile up the litter toward the rear of the house unless you have windows on all sides.

Feed wet mash at noon or at night. It doesn't matter when you feed it as long as you feed it regularly. Many feeders like pellets because they save the mess of moistening wet mash. They are appetizing and offer a welcome variety to the daily diet. They can be conveniently scattered on top of the mash hoppers in a quantity that will be cleaned up in half an hour; 3 to 5 lbs. per 100 hens are often recommended. Oats are appetizing and have a high feeding value, too, especially the new varieties that are heavy-meated, tight-hulled and low in fiber. Keep them in hoppers before the hens always, just as you do lime or grit.

Do not rely on weighing a few marked hens regularly to check on feed consumption. By the time body weight has declined, it may be too late to bring it back in time to avoid a molt, for any loss in weight is undoubtedly the result of poor feed consumption which has prevailed for some time. But when you do notice a loss in weight try to increase the consumption of feed.

Don't forget water. Keep water before the hens all the time—and keep it from freezing in winter. Nothing is more important in keeping up feed consumption and egg production. Buy a fountain heater this winter, or install a steel enclosed fire-protected heater this winter, or install a brooder stove in your laying house. It will pay for itself a dozen times in flock comfort and health; keep hens hustling instead of huddling in corners. It will save labor required in renewing litter because the heat will aid in ventilation and will thereby help in removing excess moisture.

So if you want to set your goal at a case of eggs a week from every hundred hens you keep—remember:

1. Feed a balanced ration properly blended of quality ingredients.

2. Keep up feed consumption by keeping an eye on the daily appetite, feed intake, and body weight.

3. Practice the best poultry house-keeping recommended by your feed dealer, poultry service man or extension man.

4. Keep your hens on their toes. Keep them alert and coming at you all the time—rather

than flying away in a flurry whenever you open the door.

5. Keep those cases going to town. The *faster* they come, the *less* they will cost you and the *more* profit you'll make.

6. Finally, support your breeding by proper feeding—both in quality and quantity—quality to assure balanced nutrition, and quantity to enable your hens to shell out the eggs bred into them.

# Comparison of Five Grains

Condensed from Hog Breeder

*E. F. Ferrin*
University of Minnesota

BARLEY, wheat, oats and rye are valuable substitutes for corn for growing and fattening pigs. Corn and barley which are high in starch are regarded as fattening feeds primarily, while oats and wheat with more protein are considered to be better suited as growing feeds.

Of the four small grains, rye compares most closely to corn in analysis but the results when fed to pigs have not been nearly as favorable as with corn. Rye is the least palatable of all five grains and pigs do not keep up their appetites after 50 or 60 days of feeding unless some other grain is combined with rye. Ergot affects rye more often than the other grains and as little as one-half percent of ergot makes a feed unpalatable.

Comparisons of the feeding values of the five grains will be considerably altered if any of them vary much from the legal weights per bushel. Heavy oats, especially, increases rapidly in value for hogs as the weight per bushel goes up. Shelled or ear corn is usually fed to hogs but the cost of grinding the small grains is more than repaid by the better use made of the ground grains.

Ground barley or wheat makes a good single grain substitute for corn but ground oats and rye can be fed more satisfactorily in mixtures of grains. The high fiber and the rather low starch content of oats and the lack of palatability of rye are the reasons for combining these grains with others.

Good combinations as shown by feeding experiments at the Minnesota Station are corn and oats, corn and rye or wheat and rye. Mixtures of barley and rye or oats and rye produced lower

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gains on pigs with a higher feed consumption for 100 pounds gain. In most cases these feed combinations were made up of equal parts of the ground grains. Good protein and mineral supplements were also fed in this series of experiments.

Several years ago when the prices of small grains were favorable as compared to the cost of corn, a trial was run to determine the relative efficiency of the five feed grains for making pork. The pigs were started on feed at slightly over 100 pounds average weight and fed for a period of 90 days in dry lots. The pigs in Lot 1 received shelled corn for the grain fed, Lot 2 ground barley, Lot 3 ground durum wheat, Lot 4 ground oats and Lot 5 ground rye.

All five lots were fed the same protein mixture (50% tankage, 25% linseed oilmeal and 25% alfalfa meal) and a complex mineral mixture. The grains, protein concentrate and minerals were self-fed, free-choice in all cases. Here are the results:


## Summary

1. Shelled corn and ground durum wheat produced 100 pounds of gain on the pigs with the smallest amounts of feed. These grains were used much more efficiently than barley, oats or rye. The pigs fed corn gained the most rapidly of all lots. The pigs fed wheat ate the least of the high protein feeds; only 41% as much as the pigs fed corn.

2. The pigs fed ground barley were second to the corn fed pigs in rate of gains but consumed a large amount of total feeds per 100 pounds of gain. The quantity of the protein concentrate eaten was smaller than in any other lot except the one fed wheat. There was some unavoidable waste of both barley and oats from the self-feeders; the pigs tried hard to get the crushed kernels without eating all of the hulls of the grains.

3. The pigs fed ground oats gained only 72% as fast as those fed shelled corn; required 42% more grain and ate a little more protein supplement to make 100


**A COMPARISON OF FIVE GRAINS**

| | Shelled Corn | Ground Barley | Ground Wheat | Ground Oats | Ground Rye |
|---|---|---|---|---|---|
| Average daily gain per pig, lbs. | 1.50 | 1.43 | 1.38 | 1.08 | 1.08 |
| Average daily gain per pig, lbs. | | | | | |
| Grain | 5.41 | 7.50 | 5.51 | 5.53 | 5.36 |
| Protein supplement | .90 | .48 | .34 | .79 | .55 |
| Feed for 100 lbs. gain, lbs. | | | | | |
| Grain | 359.71 | 523.33 | 398.35 | 512.35 | 494.97 |
| Protein supplement | 60.09 | 33.18 | 24.60 | 73.25 | 50.56 |
| Mineral supplement | .44 | 1.02 | 1.15 | 1.90 | 1.28 |
| Total feed for 100 lbs. gain, lbs. | 420.24 | 557.53 | 424.10 | 587.50 | 546.81 |

pounds of gain. Pigs of the weights fed are fattening as well as growing and oats does not serve very well as a fattening feed.

4. The pigs fed ground rye duplicated the gains of those fed ground oats but ate less of the grain and protein supplement for 100 pounds gain. Rye made pork at the expense of less feed than either barley or oats.

5. Based on the results of a number of other feeding trials conducted at this station, it is recommended that oats and rye be combined with other grains, preferably corn. Ground wheat or ground barley have done well as single grain feeds but oats and rye have given the most satisfactory results as a part, usually 50% of mixtures of grains.

## Farm Failures Due to Lack of Records

A study of farm records made by Penn State College over a long period of time revealed the rather startling fact that 95 per cent of failures in agriculture are due to poor business management and inadequate records or no records at all.

Says E. L. Moffitt, of Penn State: "Farming is a business and records or accounts kept on the farm business are the means whereby a farmer can study and analyze his business. It is only from accounts that a farmer can determine exactly which parts of his business have been profitable and which have not been profitable. Changes in management then can be made with something definite to warrant these changes."

The New Jersey 1946 Farm Account Books, as prepared by New Jersey's extension farm economist, W. Frank Knowles, are now available at all county agent's offices at actual cost (about 75 cents). There are two sizes, one for the average farm operation and the other for large farms. The books, which have room for a full year's records, also show how to make up the annual income tax form, and include a model form which can be torn out and be attached to the blank for filing. Every New Jersey farmer needs one of these books.

*N. J. Farm & Garden*

# Contract Chicken – "Chickenettes" Budget Packs

**Condensed from Poultry Tribune**

*Reba O'Neil*

We fattened up our first lot of chickens, and when they looked just right we simply phoned a poultry buyer to come out and take them off our hands. He did, and we were satisfied—then.

Since that first batch of super-special fryers went unglamorously to market we've changed things quite a bit. We do our own selling now. And we sell directly to retail customers. It's more profitable that way, and a lot more fun.

It happened like this. We'd dabbled in the chicken business for a couple of years and were just getting into stride when chick shortages and chicken demand curbed our expansion, but heightened our interest. We were able to keep just far enough ahead of the game to try out some poultry-promotion ideas we'd hatched. We were new enough at the business of selling meat chickens to be eager to try a lot of selling schemes and stunts instead of amiably following the pattern set by the majority of poultrymen.

And now that chicken is getting back into competition again with steaks and chops, we think the tested promotion ideas are going to keep our sales curve on the upswing. We don't want to slip back into prewar doldrums or hang on to the do-nothing attitude of the boom. That's why we're pushing promotion now. That's why we not only grow them—we BOOST them.

First, before we had anything but ideas to sell, we figured out just what kind of clientele we wanted. We picked a location that would be a first class help in getting to our selected group of prospective customers. Then we worked out the merchandising ideas, sifting through all those we had experimented with during the "get-set" years. In the meantime, of course, we were raising the best chickens we could. But that's another story.

What kind of customers were we going after? All kinds—like any seller. But we decided to specialize in furnishing premium products to people who not only could, but *wanted* to pay a little more for a lot better quality. First of all, because that's the kind of product we wanted to

**Reprinted by permission from the Poultry Tribune, Mt. Morris, Ill., Jan., 1946**

raise; secondly, because in specialization we had a marketing angle, and in premium products we had a range of specialties that would cater to a lot of tastes.

We picked a location consisting of seven acres fronting on a commercial-suburban road linking our town and the major highway. Still under development, our eight-miles-from-town acreage rubs elbows with several new substantial home-site projects; also, it sits alongside the road leading to the municipal and the country club golf greens, the riding stables, polo grounds, and the airfield. It is a site not too far out for city customers. We're on the road many of our potential customers travel frequently, and close enough in to entice the others.

Since we planned to service a group of people interested in premium poultry and unusual extras, we developed the idea of marketing Leghorn or colored cockerels about six weeks old as "chickenettes"—squab-sized, individual-service chickens. The cost is boosted by the dressing of these small extra-specials, but the quick turn-over, the low cost of production, plus the buyers' willingness to pay for the satisfaction and comparative rareness of baked or broiled personal-service-size poultry, overbalances the cost objection. For the dinner-giving host or hostess, a "chickenette" done to a turn is an easy, but extravagantly complimentary, serving for dinner guests. Clubs and lodges, especially women's organizations, furnish a ready market for this item. It is a "special event" fare requiring little handling in the kitchen. Fancy packaging boosts the profit as well as the salability.

This starting new flocks frequently and disposing of numbers of short-term "quickies" at a profit was only a part of our specialty business. We catered to the whims of hostesses in marketing packages of selected meats, such as all breasts, all legs, or combinations of chosen cuts of disjointed, ready-to-cook chickens.

We found that the person who will relish such high class service will pay the premium price for luxury items, thus absorbing the extra cost to the seller. Pint or quart cartons of chicken livers or giblets; of chicken wings; packages or "budget boxes" of less fancy pieces, such as backs, wings, drumsticks, etc., to offset the premium packs — all these marketed themselves without much selling in our community where the items were at least new in their presentation.

One of our first and most successful merchandising ideas was what we dubbed "contract chicken." It's just what the name implies—chicken sold in advance

for delivery on a specific date. We put our chicken on a basis similar to milk, delivering so many chickens so many times a month to customers whom we had sold as regulars even before we ordered our chicks.

You don't have to look far to count the advantages of such controlled sales. First, from the customer's point of view, is that "something different," a service which is sold in connection with a commodity really worth buying. From our point of view, the picture is even better. Marketing almost all of our birds in advance meant that we wouldn't have to bow, at the last minute, to low prices in order to clear our houses. We didn't advertise special prices, or run sales. Instead of raising the birds and then worrying about the all-important sale, we had the selling job done by the time the birds were marketable.

Even more important was the fact that contracting chickens in advance meant that we could schedule our processing, packaging, and delivering to fit our work calendar.

We're not a big outfit with unlimited help. Being able to weed the flocks of the "ripest" birds and process them in known quantities for immediate delivery to already-sold customers meant we could plan ahead for the work load of any given week or month. There would be other types of sales to handle, and emergency orders, but the bulk of the business could be geared to our ability to handle it easily and sensibly. We weren't swamped with work one week and out of business the next two. Nor were we forced to turn down lucrative orders because of an overload of work on the day the chickens were needed. We were able to hire part time workers to report at the peak points; and though we're comparatively small operators we weren't troubled by the simultaneous arrival of customers for dressed birds and a truck load of baby chicks, each demanding special attention. In other words, we knew where we stood.

Contracting chicken sales in advance helps the poultryman equally as much as it helps the hatcheryman to book hatches; both can estimate the sales which can be made. Only it's much easier for the poultryman to correct his overages or shortages.

All this talk about "packages" and "budget boxes" hints at refrigeration. It didn't take us long to recognize the advantage of keeping poultry on ice. Here was that "edge" in selling again; having a product a little different.

Sharp frozen poultry isn't new. But the means of selling it can be, and the reasons for selling it often are. The fuss of feathers and fixings associated with having fried

chicken for Sunday dinner lead many a housewife to the meat counter, AWAY from the undressed bird. And the sight of the sickly-looking, head-dangling, undrawn poultry that Mrs. Homemaker too often glimpses in show-cases breeds reluctance toward serving chicken. That's why we sought out the best-looking displays of chicken we could find, and decided that a carton-wrapped, good-looking packet of frozen chicken had great appeal.

With quick-freezing, we can go a step farther than "contract chicken." We can preserve birds unsold at killing time. We can maintain a "chicken bank" from which customers may draw at will. And we find that the working woman, the Sunday golfer, the host with a last-minute guest coming, the traveler en route to the lake region, the last-minute buyer, and the regular customer all are naturals for pan-ready frozen chicken. And, we're always ready for them.

People have been sold on frozen foods by the big outfits. Now, with war's end, they're being sold increasingly on *home frozen foods*. That is, they're being sold the equipment. We're planning now how we, as poultrymen, can take advantage of this trend. We're gunning for the owners of freezer boxes.

For a starting promotional idea we've lined up with a firm that is selling frozen food cabinets. With each of their sales we provide one of our extra-special, ready-to-be-frozen chickens, with our compliments. We take this sample to the new freezer owner, introducing ourselves and our product at the same time. It's cheap advertising and a sure friend-maker.

We keep a checklist of our town's frozen food box owners, who make up an important part of our prospective sales list. We know, with this list, that we're shooting at a target, not just letting fly the usual barrage of mailing pieces and newspaper advertising, hoping something will get in the way of it. We combine advance "contract" selling with home freezer ownership and produce a type of promotion that ends, usually, in quantity selling of a quality product at a specific time, for a specific purpose.

We've worked out promotion plans that definitely are in the to-come class. To come, that is, when we have more birds to sell, less development and more selling to do; when we have canvassed our present load of potential customers and are out searching for new. Seasonal selling holds plenty of possibilities. Trucking our poultry products to summer and winter resorts on specified days; catering, house by house, to the vacationing crowd looms as a next year's "must" for us. No, we'll not "peddle." We'll

announce our coming with advance sales messages by direct man. We'll pick our customers. And we'll provide a service not now provided here.

Sectional selling rears its head too, these days. As soon as the tailor-made units we want are available we've scheduled a branch business of selling to supplement the home - selling job we're now doing. We plan to dispense frozen or fresh iced chicken in self - owned sales units spotted in stores in our own city and in such neighboring communities as we can service. Whether it will be on a rental, profit sharing, sales percentage, or some other basis, this selling will be from the new reach-in freeze cabinets located in the heavy-traffic markets with which we can associate ourselves. In this case, as in other sales we're proud to make, we will tattoo our chickens, thus maintaining our own identity and building up a name for our special - brand chickens.

There are lots of other ideas for selling chickens. Maybe today they sound outlandish. But we'll go along, experimenting with a few sales, believing that tomorrow they'll bring in business as today's contract chicken, chickenettes, budget packs and the other present developments do. Anyhow we hope so, for it's expanded sales that pep up the poultry industry—the sales, the ideas, and the service behind them.

## Sweeter Sap

New Hampshire Experiment Station foresters are trying to grow maple trees with "sweeter dispositions."

They found that the sugar content of the sap from trees varies from year to year; also that the individual trees are consistently "sweeter" than others.

One of the trees, "Sweet Sue," runs sap that averages 9.82% sugar, about three times sweeter than average.

Last year the foresters took cuttings from the sweetest trees in their experimental plots, successfully carried them over the winter in greenhouses, and transplanted them to the nursery.

It will be several years before the cuttings will yield enough sap to determine their sweetness, but the foresters are hoping for a plantation of trees that will average two or three times sweeter than today's normal.

*—Farm Journal*

# Colorado's "Fence Post Farm"

**Condensed from The Western Farm Life**

If you should run across the "fence-post farm" on the campus of Colorado A. & M. college at Fort Collins, don't conclude that the Aggie "professors" are trying to grow posts that way!

The "fence-post farm" is part of a research program started in 1943 by the forestry and range management division. It is to help farmers in the western states solve the problem of keeping good fences for long periods of time under a variety of moisture conditions.

A supply of posts is available from Colorado forests in almost unlimited amounts, reports R. J. Preston, forest utilization authority. As they come from the forests, however, they are a poor investment as fence posts, because they decay in the ground in a few years. But treated properly before being set out, these same posts will stand for 20 to 30 years or more.

"Treating of native posts in Colorado is one of the best investments a farmer can make," Preston says. "Proper treatment makes them equal to any type of post obtainable from any source, and extends their useful life from three to five times the mortality of untreated posts."

The fence-post farm is furnishing information on all the various methods of treating posts to determine those most satisfactory under Colorado conditions. Colorado lodgepole pine and aspen posts are being used in the present tests, and are being compared to western red cedar posts which are long-lived without treatment. Western red cedar trees, however, do not grow in Colorado.

Treatment in the tests includes the old standard method of hot-and-cold-bath creosote. The objection to this plan is that it is a long, somewhat messy, and fire-hazardous job for the farmer or rancher. Also used in the tests is the pressure-creosote treatment, a commercial type method not useable on farms, but very effective.

The newer tests now on trial at the college include those with chlorinated phenols and water-soluble salts. A scalping treatment of living trees to cause resin impregnation of the growing wood also has some possibilities, and posts so prepared are included in the college experiment.

The posts are set on high land, on wet lowlands, and under non-irrigated and irrigated conditions. Untreated posts are included as a check on results.

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Preston points out that the hot-and-cold-bath creosote method has long been used in this state, and gives excellent results, at least tripling the life of native fence posts. The chlorinated-phenol types of preservers, and the water-soluble salt types have not been in use more than 8 to 10 years, but indications are that they will be effective under the rather arid conditions of Colorado, where leaching is less of a problem than in other sections of the country .

Colorado lodgepole pine is especially suited for use as fence posts, because of its freedom from branches and its uniform diameter and straight growth. Properly treated, lodgepole pine fence posts cannot be excelled, Preston says.

The tests are part of a long-time research program at Colorado A. & M. college and, additional varieties of native woods and other types of preservatives will be added. Further results will be made known when they are obtained.

## Farming in a Cellar

One of the most novel and profitable small farms in the country is conducted in the depths of a cellar in the heart of Chinatown Boston, by Harry Yen, an enterprising young Chinese. There under an old brick tenement house, he raises bean sprouts, that succulent, mineral-rich shoot that goes into the making of chop suey and chow mein for the restaurants of the city.

Yen gave up his laundry business to engage in this large scale venture in Mung bean sprouts, installing a heating and industrial hot water system to carry on the culture, which has made him the Bean Sprout King of New England. Eventually he hopes to branch out from his restaurant trade to supply groceries, for the sprouts make an excellent salad vegetable.

The Mung beans, looking like dried peas are planted in galvanized cans, which are filled half full of the beans placed over a cement trough and periodically doused with water. Within five days the beans have swelled up to the cover of the can to the amount of 70 pounds, ready to be eaten. The space occupied for the underground farm supplies five tons of sprouts every five days, all of which are sold in advance.

*—American Agriculturist*

# Chore Clinic for Dairymen

**Condensed from Successful Farming**

*Ivan R. Bierly*
**Cornell University**

"TIME is money." In these days of commercialized farming, this statement is even more true than when first made years ago. And with somewhat lower farm prices, but continuing high farm wage rates in prospect, the idea expressed in this statement will be even more important in the years ahead.

The return that the cows make for labor is determined to a large extent by the effectiveness with which labor is used. The amount of work accomplished—not how hard a man works—determines a farmer's level of living. And it may also affect a son's decision as to whether he will want to make farming his life work.

Every group of records kept by dairy farmers has shown a wide variation in the amount of labor necessary to care for a cow. In 1943 about 40 dairymen in New York kept cost accounts with the New York State College of Agriculture. The fact that these farmers kept these detailed records shows that they are very much interested in reducing costs. But, even on these farms, the number of hours of labor to care for a cow in a year varied from less than 100 hours on a few farms to more than 200 hours per cow on others—a 100-percent difference.

The big questions which these experiences of farmers raise are: Why is this variation between farms so great? What are the things that those farmers who use the least labor to care for a cow do to get by? What are the things that other farmers do, *or do not do,* that make it necessary for them to use more hours of labor to care for a cow?

A study of the way chores were done on 17 typical dairy farms in New York last year is beginning to reveal some of the answers. Much more is to be learned about how some farmers save time and effort, but so far this study has shown three important factors: (1) the arrangement of the stable for greatest possible convenience in doing the work, (2) the use of laborsaving equipment, and, sometimes hardest of all, (3) developing a work routine so that the operator works while he walks, and uses equipment as efficiently as possible. Let's take up these three items individually.

The arrangement of the dairy stable to a considerable extent affects the way in which the work can be done. Furthermore, when the concrete has once been poured, changes in the arrangement are not made very often.

The dairy stable on the farm of A. J. Sears in Cortland County, New York, is not perfect, but, because Mr. Sears and his hired man did their chores with less travel to take care of a cow than any of the other farmers included in this study, the arrangement of his stable is worth studying.

The stable in Mr. Sears' dairy barn is 36 feet wide, and the cows face out. There is an eight-foot driveway the length of the dairy stable between the two rows of cows. A four-foot feed alley in front of the mangers on each side of the barn gives plenty of room for Mr. Sears and his hired man to use both a silage cart and a grain cart while feeding.

There are wide cross alleys at each end of the lines of cows. The milkhouse is located at one end of the dairy stable.

The most important jobs, in the order of the amount of time and walking required to do them, are (1) milking and taking care of the milk, (2) cleaning the stable, and (3) feeding the cows. A conveniently-arranged dairy stable should be arranged so as to make it possible not to do only one of these jobs efficiently, but rather to do all of them with the least total time and travel possible. For example, having the cows face toward the middle of the barn, as is sometimes done, saves time and walking while feeding the cows, but increases the time and walking for both milking and cleaning the stable. And the jobs of milking and cleaning the stable really are the two most important ones, in terms of both time and effort involved.

Furthermore, most farmers agree that the milking and cleaning jobs involve more hard work than feeding. Since both of the milking and cleaning jobs are done behind the cows, having the cows face out saves time and hard work.

The milk is carried down the center of the barn to the milkhouse from all of the cows. This requires less walk than would be necessary if the operator had to walk clear around the edge of the barn on his way to the milkhouse, as is necessary when the cows face in. Being able to drive the manure spreader thru the barn and load the manure directly into the spreader also saves time and a lot of hard work in cleaning the stable.

Having wide feed alleys in front of the cows, with cross alleys at each end of the barn, made it possible for Mr. Sears to feed silage and grain by making one trip with his feed cart around

in front of the cows. The cross alleys at the ends of the barn eliminated all of the backtracking that might otherwise have been necessary if the lines of cows had extended to the wall of the barn at each end.

Because Mr. Sears has a rather large dairy herd, which means two long lines of cows the length of the dairy stable, he would have been able to save many more steps each day, and many miles of walking in a year by having the milkhouse located in front of the middle stanchion, west side. If he had a cross alley at that central point, it would have been unnecessary to carry the milk from each cow clear down to the south end of the barn to get to the milkhouse.

Making use of laborsaving equipment was the next important point. We have already mentioned that Mr. Sears used feed carts for moving both grain and silage while feeding the cows. Farmers who did not use feed carts for silage and grain were walking two to three times as far, and in some cases even more than that, to supply these two feeds to the cows. Also quite important is the fact that transferring the load from the farmer's feet to wheels saves most of the hard work involved in carrying the tons of silage and grain which even a small herd requires during the year.

Enough silage is thrown down the silo chutes at one time to feed all the cows. The silage cart holds enough to feed all the cows on one side of the barn at a time. The cart is filled and the cows on one side of the barn are fed. Then the cart is returned to the silo and refilled before feeding all the cows on the other side. Only two trips are made to the silo, and only one trip is required to supply the cows on each side.

Mixed feed is purchased and stored in bulk in the feed room at one side of the dairy stable. The cart used when feeding grain is filled in this room, and then the grain is supplied while making one round trip about the barn in front of the cows, using the cross alleys at both ends during this trip. In this way, no backtracking is involved in supplying grain to cows.

One very important thing to have in mind in building a feed cart, whether for grain or silage, is to have large wheels. Many farmers have found that the wheels from an old car are excellent for this purpose. Of course, the feed carts must be built so that they can be used readily in the feed alleys and cross alleys in the barn. A number of agricultural colleges have sets of plans available which will give good suggestions to many farmers on how to build feed carts.

Probably the most important

single laborsaving piece of equipment that a dairy farmer with 12 to 15 or more cows can have is a milking machine. Not only does the milking machine save much of the time in milking the cows, but eliminates a large part of the drudgery involved in milking by hand. But, for best results in terms of health of the cows, milk production, and efficiency of operation, it is highly important that the milking machine be used properly. In this connection, of special importance is the matter of following the instructions that the manufacturer of the machine gives with respect to the amount of pressure and the number of pulsations per minute.

Studies have been made in recent years in several states which show that on farms where milking machines are used, a lot more time still could be saved by better use of the machine—which means simply faster milking. Careful time records on more than 300 cows on typical dairy farms in New York showed that only three cows in 10 were milked with the machine in less than five minutes. The average was six and one-fourth minutes to milk a cow. Similar studies in other states have shown about the same results.

Practically all cows can be milked in less than five minutes. E. W. Rhodes and Son in Chemung County, New York, have been milking their cows in about three minutes each. They use a three-minute egg timer to tell when the machine is to be taken off each cow. One man operates the two single units of the milking machine, while the other man strips the cows and carries the milk to the milkhouse. The cows are stripped as soon as they are milked.

With one man handling two single units on a 20-cow herd, reducing the milking time from six and one-fourth minutes to a cow to four minutes would save three-fourths of an hour each day. In a year's time that adds up to 28 ten-hour days, or one full month of work. The idea of milking cows with the machine in three to five minutes is still new, but farmers themselves, as well as experimental evidence, have found that it can be done.

Training slow-milking cows to let down their milk more rapidly is not always easy, but in nearly all cases it can be done, as indicated by the experiences of farmers who have done it. Of course, it is easier to train a young cow to let down her milk rapidly than to retrain an old cow.

Stripping the cows after milking with the machine required, on most farms, at least a minute, and on some farms two minutes to the cow. It has been clearly demonstrated by farmers that 10 to 20 seconds are all the time needed

to check on whether or not the cow was milked reasonably dry with the machine.

The proper use of the milking machine is important to get the cows milked dry. Actually the process of milk production is continuous. To remove absolutely all of the milk from the cow's udder it would be necessary to strip the cow almost all day. Leaving a cupful of milk each milking time does no harm to the cow.

Furthermore, spending more time than is really necessary in doing the stripping encourages a cow to be slow about letting down her milk during the whole milking process. This seriously complicates the development of a fast-milking routine. When training cows to milk faster, extra stripping would be desirable at the start but do not prolong it.

The way the work is organized (the order in which the jobs are done) and the care with which the tools are kept where they are needed, was the third point. Careful planning of the work can save many extra steps.

Take Ralph Space in Tomkins County, New York, for example. He has developed a well-planned chore routine that saves many steps and minutes each day. He works as he walks, scraping the platform behind the cows on one trip, and then sweeping it on the return trip. When he finishes the scraping, the broom that is used next is right at hand. Without a single step, he takes it from its place on the wall and goes to work. Both the scraper and the broom are returned to their places during later trips for other purposes. There is a minimum of lost motion, which indicates a well-planned routine.

The same is true when he feeds hay; there is a hayfork beside each chute. And when he sweeps the calves' manger, as well as the cow mangers, the broom for each purpose is always in its place. Each tool has its purpose, and each is always where it belongs.

Most milkhouses are not very large, but it is surprising how many steps are made in the milkhouse each time chores are done. Alton Mott, Tomkins County, New York, did a lot of careful planning in arranging his milkhouse, and by doing so saved at least one-half to two-thirds of the steps that many other farmers take in doing their work of getting the milking equipment ready and cleaning it up afterwards. In his milkhouse, all of the things that he needs in getting ready to milk, and all of the things that he needs in cleaning up the milking equipment are within arm's reach when he stands in front of the sink.

A convenient arrangement of equipment and storage racks in the milkhouse is not the whole story. A good supply of hot water

is also essential. A reliable cleansing agent aids greatly in the cleaning process by softening the water and cutting the milk fat, which otherwise is difficult to remove.

Care of young stock involves a lot of work on some farms. Having them run loose in pens saves some of the time required to give them individual care in stalls. This is especially true when these pens are located in the barn so that the manure spreader can be driven by the pens on the same trip thru the stable as when the cow manure is removed. Just as good a job of raising the heifers can be done in this way, in the opinion of farmers who do it, if the heifers are not too crowded.

A heifer drinks several gallons of water a day. On one farm, in order to water six young calves the farmer walked three miles a month, and half of the distance he was carrying water.

One of the encouraging things during this study was that we learned something new on every farm that was visited. One or more of the jobs in caring for cows had been carefully planned on each farm.

What is needed to make the best use of time and effort in the dairy barn is to make a careful study of all of the jobs. One of the first steps should be to draw a map of the floor plan of the stable, including the milkhouse. Then use the floor plan to find the places where backtracking and other unnecessary walking are required in doing the work.

On the new floor plan, try to provide space for feed alleys wide enough to make possible the use of feed carts. Have enough hay chutes to avoid carrying hay farther than necessary both in the mow and on the barn floor.

Just one more illustration of how important a small saving each day becomes in a year's time: On one of the farms studied, the farmer and his son walked six miles a day in the winter season to care for 20 cows. On another farm, the farmer and his hired man walked only about two miles to do the same job. The extra four miles of walking a day on the first of these farms, over the period of seven months during which the cows are kept in the barn, adds up to more than 800 extra miles of walking in a year. The extra walking is equivalent to walking almost all the way from Chicago to New York City —and all within the dairy barn.

Yes, "Time *is* money." And doing dairy chores involves a lot of hard work. But the time spent planning for a better dairy stable before the concrete is poured, and developing a better chore routine will pay dividends both in terms of money and energy saved.

# "Pep" Bluegrass Pastures

**Condensed from Farm Science Reporter**

EXPERIMENTS conducted by the Iowa Station at the Pasture Improvement Farm, Albia, point the way to making bluegrass pastures produce more feed.

Two treatments of 5-acre pastures were compared side by side with untreated pasture. The check pastures (all of the treatments were in duplicate) received no treatment. Two pastures were treated with 3 tons of limestone per acre, heavily disked and reseeded to a mixture of clovers and lespedeza. The third set of pastures was limed, disked and reseeded in the same manner and in addition fertilized with phosphate.

Steers were then put on these pastures to determine the number of days of grazing that the pastures would stand and how much "beef" each would produce.

The pastures without treatment gave an average of 83½ days of grazing and the gain of the steers was 97.5 pounds each. In comparison, the pastures limed, disked and reseeded to the clover-lespedeza mixture gave an average of 111½ days of grazing and produced 143 pounds gain of weight per steer. This decided increase was obtained the first year after treatment in which the bluegrass sod was drastically torn up.

The steers on the pastures that were limed, disked, reseeded and given phosphate fertilizer treatment did not gain as well as those on pastures not given phosphate the first year, but in 1945, the second year after treatment, the pastures with phosphate showed a decided advantage over those limed, disked and reseeded only.

These tests point out clearly that liming, disking and reseeding with clovers and lespedeza can greatly improve southern Iowa pastures.

The clover-lespedeza mixture consisted of 5 pounds biennial white sweetclover, 3 of medium red clover, 2 of alsike and 10 of Korean lespedeza. Lime was applied in the fall and all pastures to be reseeded were springtoothed and heavily disked in the fall. The phosphated pastures received 250 pounds of 20 per cent superphosphate in the spring.

Only six soybean strains out of a total of 3,000 tested at the Iowa Station in the period from 1937 to 1942 were sufficiently promising to warrant further trial. These selections will probably not be released as varieties but will be used as parents in the attempt to breed their desirable qualities into new varieties.

Reprinted from Farm Science Reporter, Ames, Iowa

# Apple Scab and Its Control

Condensed from American Fruit Grower

*A. B. Burrell*
**Cornell University**

Scab is a fungous disease capable of damaging leaves, blossoms, fruits and (rarely) twigs. Many think of scab only as causing superficial black spots on the fruits, but this is one of milder forms of the disease. Scab on blossom stems prevents the formation of fruits of such varieties as McIntosh. Scab on fruits may crack them open or cause them to drop off. Scab on leaves reduces photosynthetic-efficiency, increases spray injury, and may lead to defoliation. When leaves drop off early, the trees may fail to bloom the next year, and are susceptible to winter-injury.

The casual fungus *(Venturia inaequalis Cke. Wint.)* winters in dead apple leaves on the ground. It produces ascospores in early spring, which are discharged during rains, float in air currents, and establish the fungus on leaves and other green tissues of the apple tree. New crops of ascospores are discharged during successive rains until 1 to 4 weeks after petal-fall. About 10-14 days after infection of young leaves or fruits, a new crop of spores (conidia) is produced, capable of causing new infections on leaves or fruits. The conidia move only as far as they are washed or splashed; they do not float from tree to tree. Conidia may continue to spread the disease throughout the summer.

Among the reasons why scab was bad in 1945 were:

1. Duration and frequency of rains.
2. Reluctance to apply fungicides during the prolonged bloom, because of fear of further reducing the crop.
3. Unavailability of fungicides when the leaves appeared weeks ahead of the usual date.
4. Difficulty in applying sprays or dusts at the usual stages of bud development in the face of rain, mud, shortage of help and aging of machinery.
5. Failure to appreciate how much more frequently or heavily than usual, fungicides must be applied in so rainy a reason.
6. Reluctance to spend time and money spraying, when crop prospects were poor.

Reprinted by permission from American Fruit Grower, Jan., 1946, Cleveland, Ohio

Growers are concerned about how next year's performance of the trees will be affected. While it is not possible to predict with assurance, past observation of trees in similar condition may provide a few clews. It seems doubtful if trees that lost nearly all of their spur-leaves within a month or so after petal-fall will bloom in 1946; and such trees may be vulnerable if there should be severe cold this winter. The weak, secondary leaves that appeared on some spurs in July probably were of limited value. Relatively few trees were this bad; most of the worst ones were of the variety McIntosh. Trees that held half or more of their leaves through July, and carried little or no fruit, probably have formed some blossom buds, the strength of such buds varying with the leaf surface. Varieties like Baldwin that are fickle about blooming may have been more adversely affected by partial defoliation, than others. Trees that had fair-looking foliage through August probably formed plenty of blossom buds, even though the leaves were imperfect. On the whole, it is believed that there will be at least a moderate if not a heavy bloom of apple trees in the East in 1946, though the lack of sunshine in some localities may have affected the differentiation of blossom buds adversely.

One point in the situation seems clear: there is a tremendous carry-over of the scab fungus. And moist, mild weather, extending into November, doubtless has been favorable to the fungus.

Faced with this threatening situation, what can we do about it? We should provide normal but not excessive fertilizer for next year; abnormally high nitrogen applications in 1946 will not materially offset the damage from scab and spray injury in 1945. Of course, we should avoid spray injury, but above all, we must control scab in 1946.

By spraying the ground in the orchard and adjoining fence rows about the time green tips appear on the trees in the spring, it is possible to reduce the quantity of ascospores discharged by 90-99%. This practice is of possible value principally for isolated orchards. If spring rains are barely long enough to permit infection, the trees on which appreciable numbers of primary leaf-lesions develop are those within a few hundred feet of the source of the ascospores. If rains are prolonged, ascospores may be carried thousands of feet, or even miles, but their abundance decreases with distance from the orchard where the dead scabby leaves are lodged. Spraying the ground in one orchard is not worth considering if the ground in adjoining or nearby blocks is not sprayed.

Ground-spraying requires 500-

600 gallons of solution per acre. The most widely tested material is Elgetol at 2 quarts in 100 gallons. The cost of the dilute solution is somewhat over $1.00 per 100 gallons. Chemically, Elgetol is sodium di-nitro ortho cresylate plus a penetrating agent. Doubtless, there are numerous other chemicals that would be as good or better. Some mixtures that have given promising results experimentally as a ground spray for scab are 100 pounds of sulfate of ammonia in 100 gallons of water, or nitrate of soda plus a penetrating agent. Most growers would not want to put so large an amount of nitrogen on their orchards. Dr. G. W. Keitt of the University of Wisconsin at Madison, who is largely responsible for testing eradicant ground sprays, has developed a wide, stationary horizontal boom for this purpose, for use on level land. On a boom, nozzles giving a flat spray probably are preferable to those producing a cone. Some growers spray trees and ground with ½% Elgetol on a single trip through the orchard, this strength being adequate to kill aphis eggs on the twigs. At best, ground spraying is an expensive supplement rather than a substitute for growing-season sprays for scab, and up to now, has not been extensively practiced in the Northeast and perhaps never will be.

The timing of scab sprays is all-important. Unless there is conclusive evidence to the contrary, one should assume that the ascospores are ripe as soon as there is green tissue on the tree.

The commonest plan formerly was to spray for scab when the apple buds are at particular stages of development, as "delayed dormant," "pre-pink," etc. While often giving good results, such a system fails completely in a rainy year like 1945. Any general plan must be modified from day to day and even from hour to hour. Spray service organizations advising the growers attempt to do this, but final decisions must be made by each grower. The basis for such modification is a knowledge of the relation of weather to development of scab. Early field studies by Wallace and others in New York and greenhouse studies by Keit and his associates in Wisconsin demonstrated some fundamental relations between rain, temperature and scab infection. From field records of time, temperature and amount of infection over a period of years in western New York, Dr. W. D. Mills of Cornell ascertained the actual wetting at various temperatures for light, moderate and severe primary infection.

If an elemental sulfur spray or dust is applied before the leaves have been wet long enough for scab infection to have taken place, it prevents scab. When neces-

sary, this may be done during rain, preferably not a downpour. For example, if the temperature is 50 degrees F., one may control scab if such a dust or spray is applied before the leaves have been wet 14 hours. If the temperature is 65-70 degrees F., the sulfur must be applied before the leaves have been wet 9 hours. If applied later, it may reduce the amount of scab that would become established in the latter part of the rain, but some lesions will appear. It is customary to use only a fungicide when spraying during rain; it is doubtful if most insecticides would function during the wet period or leave enough residue to justify their inclusion.

Applied to dry foliage immediately after a scab rain, liquid lime sulfur, 2-100 may prevent the appearance of lesions. This after-rain effect of lime sulfur continues until about 50-72 hours after the *start* of the scab rain, depending on the temperature. From the end of this 50-72 hour period until the scab breaks through the surface of the leaf, some ten days later, the fungus is out of reach of fungicides, and lime sulfur is no more effective than other materials. All that any of them can do at this stage is leave a residue as protection against infection in the next rain.

The practical plan for most growers is to try to have all foliage covered with sulfur ahead of each anticipated rain. Radio, newspaper, spray service warnings and a barometer may help you anticipate what is coming. Dusting may be employed to hasten the rate of coverage. It is of great practical help to know, however, that if you are caught you can apply elemental sulfur or dust sprays during rain. Such treatments usually are made during light rain or drizzle or between showers.

Most years, a heavy spray just before blossoms open, will protect against scab throughout the bloom period, but it is difficult to cover a large acreage at exactly this stage. In 1945, serious spread of scab occurred during the prolonged bloom, which in some areas extended over 4 weeks. Admittedly, there is danger of reducing the set of self-unfruitful varieties like McIntosh by sprays or dusts during bloom. However, the author's experience shows that one blossom-time elemental sulfur spray or dust usually can be made without reducing yield, and where opportunity for cross-pollination is good, two such treatments may not reduce yield. In 1945, some McIntosh crops were lost from scab on the blossom-stems. However, even disease-free, unfrozen, hand pollinated McIntosh blossoms failed to form fruit in some cases. Blossom-time sprays or dusts were invaluable in 1945; in fact, good

scab control was rare without them in New York. In varieties that usually set ample or excessive numbers of fruits, the risk of hurting the yield by an elemental sulfur spray or dust during bloom is not great. Lime sulfur is too caustic for such sprays. Bordeaux mixture during bloom is more likely to reduce the set or russet the fruit than are elemental sulfurs. Of course, all poisons like lead arsenate, nicotine, DDT, etc. must be omitted because of danger to bees.

*Materials*

For spring sprays against scab, the flotation sulfur pastes, because of their fine particles and relatively low cost, are desirable. Dry wettable sulfur materials are coarser and wash off a little faster but often are effective. Especially for spraying in the rain, paste sulfurs, free from wetting or spreading agents, are preferred as the spreader may lower the deposit and increase the washing-off of the sulfur. Sprays applied during rain may or may not leave enough deposit to protect through a later rain. An increase of 30% in pounds per 100 gallons over the amount used on dry foliage, would be a good precaution. An oil-type sticker, like Orthex, may be helpful for sprays in the rain, but good results often are obtained without it, especially with paste sulfurs.

Sulfur dusts for protection against scab rose in the esteem of growers who used them intelligently in 1945. Even when applied from just one side of the tree they gave a considerable measure of protection. The light weight of dust and dusting machines was especially appreciated when mud was so general. It seems worth while to get dust of the finest particle size now available.

Lime sulfur 2-100 applied to established scab spots on leaves, tends to "burn out" the fungus and kill most of the leaf tissue at the site of the spot. Elemental sulfurs do this only in very hot weather. The "burning out" often is incomplete, however. Applied to leaves carrying numerous scab lesions, lime sulfur often does more harm than good.

While the use of lime sulfur is diminishing because of its injurious effects, it would be ill-advised to say that it has no place. If sprays are applied only when trees are dry, and without regard to infection periods, experiments usually show a higher percentage of scab-free fruits with lime sulfur than with the elemental sulfurs. This is because of its after-rain and eradicant effects. There is usually some reduction in yield from lime sulfur the current season or the next. This may be minimized if the spraying is not very heavy, is done in cool, relatively dry

weather, and early in the season. Some varieties like McIntosh are more resistant to spray injury than others like Baldwin. Vigorous trees recover more rapidly than weak ones. The eradicant and after-rain effects of lime sulfur have been mentioned. When lime sulfur dries on the foliage or fruit it leaves a protective sulfur deposit which is similar but not superior to those left by paste sulfurs.

There are numerous cases where the "burning out" of foliage scab with lime sulfur early in the season, increases the percentage of scab-free fruits. If foliage scab is abundant, lime sulfur may cause severe burning and hasten the dropping of leaves. Diluting the lime sulfur to less than 2 gallons in 100 may reduce "polysulfide injury," but increase arsenical injury. On the whole, the use of this potent fungicide calls for discretion. Its greatest value is for emergencies, or for use by those growers who do not time their scab-control sprays accurately.

Lime sulfur is a true solution, not a suspension. If applied during rain, most of it washes off, leaving a poor deposit. If applied when it is not raining but on wet foliage, it sometimes causes severe injury. The same is true when it is applied to dry foliage if humidity and lack of air movement make the spray dry slowly. If the temperature is above 80° F., the injury is likely to be excessive even with good drying conditions. Sprays that soak the under surfaces of the leaves, such as codling moth applications from the ground or low platforms, are the ones that cause the worst lime sulfur damage. It seems reasonable to hope that some organic fungicide may be developed that will prove superior to lime sulfur in effectiveness and safety, but it takes years to evaluate new materials adequately.

Since elemental sulfur sprays or dusts may be applied to either wet or dry foliage, the grower has far more hours suitable for their application than for lime sulfur, which is restricted to dry foliage. Growers who had only lime sulfur on hand in the spring of 1945 were handicapped because there were so few hours when the foliage was dry. When time to do the work is the crucial factor, the use of dusts or elemental sulfur sprays sometimes gives better control than lime sulfur. The wise grower will devote some winter time to learning the precise relation of rains to scab infection and to learning the characteristics of the fungicides. Then, starting the season with both an elemental sulfur and lime sulfur, he will be able to choose whichever best meets the conditions of the moment.

The foregoing discussion has

dealt almost entirely with the primary scab infection period extending from the appearance of green tips until 1-4 weeks after petal-fall, since it is during this period that the scab battle usually is won or lost. Usually, a fungicide must be included in the cover sprays. It is of tremendous help if scab has been held at so low a point that its control can be relegated to a secondary place. When this is the case, one may consider reducing the amount of elemental sulfur per 100 gallons to reduce the risk of cheek-scald on the fruits and the amount of visible residue, or switching to weak Bordeaux, to a mild copper material or an organic fungicide for control of diseases not held well by sulfur, or for the sake of compatibility with other constituents of the spray mixture. By summer, it usually is necessary to give first attention to codling moth control.

## Oats for Pigs

E. L. Quaife, Iowa State College swine specialist, says that while oats may be a high priced feed, they can be used satisfactorily in the ration if corn supplies are short. The oats should be worked into the ration gradually.

Piggy sows may be carried through the summer on pasture with a ration of 95 percent ground oats and 5 percent supplement, self fed. Growing pigs, from 50 to 125 pounds in weight, will do well on a ration of 75 percent ground oats, 20 percent corn and 10 percent supplement. Heavier hogs, however, should not receive more than 50 percent oats with 45 percent corn and 5 percent supplement.

Oats fed in large amounts should be ground to medium fineness, Quaife says. And a fresh supply of drinking water should be near by when ground oats are self-fed.

If oats make up the entire ration of the growing pig, some should be fed dry in a self-feeder. Additional amounts should be soaked and fed as a thick mash at least once a day, because pigs will not eat enough dry oats alone to do well. The ground oats should be soaked for 12 hours before being fed.

*—Hampshire Herdsman*

# Heirloom Vegetables

*Archer P. Whallon*

HAVE you a living heirloom—something that has been handed down in the family from generation to generation—something alive, that grows and reproduces itself—in other words, a plant variety? It may be, if you are people of the land, a family for generations good farmers and gardeners, that you do have such a treasured vegetable or farm crop variety. If you do, it's time for you to help solve the reconversion problem and add to the welfare of your fellow humans by sharing with them your treasure. And you may be assured that scientific plant-breeders, the seed trade, and commercial market gardeners will appreciate your contribution.

Along with the most exacting and intricate processes of plant-breeding, of selection, isolation, and hybridization—of plant exploration to all the ends of the earth, our plant investigators and originators are turning to the neglected field of the local, family heirloom, one might almost say, folklore vegetables of our native land for new plant-breeding material. For the past two seasons articles descriptive of these local varieties, these heirloom vegetables, have been frequent in the seed trade and horticultural press. Typical is the story of the "Dove" watermelon.

This melon, now sponsored or "released" by the Regional Vegetable Breeding Laboratory of Charleston, South Carolina, under the name "Dove" is recommended for its resistance to disease, wilt and anthracnose, and for the exceptionally high sugar content of the fruit. A published report states that "most abundant among its sugar types is the extra sweet and easily digested one called fructose: the sucrose, glucose and fructose ratio being 0.13, 2.44, and 5.59 respectively." The sugar content of the Dove melon is 10.6 per cent (refractometer reading) a high figure for watermelons and above that of Tom Watson, the variety hitherto regarded as the standard of excellence among shipping melons of the South. Unfortunately the Dove has too brittle a rind to be a good shipper and it is known but to few consumers in the North. The Charleston Breeding Laboratory now states that they are now—"well advanced toward production of Dove types which exhibit resistance to wilt and an-

thracnose and have a tough rind, while retaining Dove quality and appearance."

But the point of pertinence is that this Dove watermelon is nothing new but has had a long local history in Darlington County, South Carolina, and has been sold in the South under many names—Garrison, Gandy, Dude Creek, Wilt Resistant Dixie Queen, and others. Furthermore its earliest history is said to have begun with seed brought to Dovesville, South Carolina, by J. C. Dove in 1865 from a few seeds of a melon he bought at the Chattanooga railroad station after he was mustered out of the Confederate army." What its prehistoric life was nobody knows, but here we have a lapse of eighty years and more for a superior local or heirloom vegetable to receive national recognition of its worth.

Another interesting phase of this discovery of local varieties is shown by the attention now being given to the "heirloom beans" of New England. Up in the rigorous climate and short growing season of northern New England, in New Hampshire in particular, local growers have long cherished and cultivated a group of bean varieties distinguished by brilliant coloration and excellence of flavor. Some of these like the Yellow Eye, Soldier, and Jacob's Cattle, are exceptional for the peculiar marking of the seed which is used as a dry shelled baking bean. Flash and Brilliant are rivals for having the most highly colored pods of any bean varieties in cultivation. Here also is grown the Sulphur, Brimstone, or Golden Pea baking bean, a favorite also with the French Canadians and with mountain people of the central South. Some of these beans possibly do not give the high yields required for market competition with the commercial pea, navy or kidney commercial bean varieties, but they are all attractive to the home gardener and to the plant-breeder in search for superior quality stocks.

In point of origin geographically remote, but truly "heirloom" in the fullest sense of the term are the vegetable varieties derived from those of the Indians, notably the Mandan, Hidatsa, and Arikara tribes, of the central Northwest. The varieties from the Dakotas are naturally distinguished by their earliness and ability to survive adverse weather conditions of cold and drought. They make it possible to have gardens at high altitudes and bring corn, beans, melons and squashes to northern Alberta and Saskatchewan where other types could not possibly mature. Incredible as it may seem many garden crops, including tomatoes have been grown in Baffin Land,

north of the Arctic circle, and corn has been grown in the northern Peace River country. Best known of these early corn varieties, the Nuetta sweet corn was obtained from a Mandan Indian over thirty-eight years ago. It is described as the hardiest variety that yields well under harsh dry conditions, meets the requirements of the mountain country, and also gives excellent results in the moist climate of the Pacific coast. The dry seed is red but when ready for the table the seven-inch long ears are a golden yellow. Then there is Pickaninny, from northern Canada, a "midget" variety with dark blue ears—the earliest sweet corn in the world. There is also an extensive list of the Indian flour corns—not strictly speaking, sweet corn, with ears and individual grains having some resemblance to our common flint field corn. But the Indian flour corn has soft kernals, easily ground and digested, and is much preferred by many people for both human and animal food. These early, hardy Indian varieties have been of great value to the plant-breeder in creating a new "corn belt" in the Northwest from the Dakotas to over the Canadian border. Of particular interest to the ornamental and home - decorative crafts gardener are the red, blue, and mottled or variegated varieties bearing such names as: Zuni, Winnebago, Mandan, and Arikara Blue; the Red Peruvian; the Rainbow (with ornamental red, green, white, and yellow variegated foliage), and the mixed or Squaw corn, bearing ears of mixed colors, with red, white, yellow, and blue kernels—the source, undoubtedly of the ornamental corn sold by some Eastern seed houses at relatively high prices. Adaptation to a semi-arid climate is a quality of some of these Indian corn varieties quite as pronounced as extreme earliness and resistance to cold, and one type of Navaho corn if planted approximately a foot deep to put the seed in moist soil, will sprout and push its way to the surface.

The Great Northern or Idaho baking bean, now a major farm crop in the Northwest and familiar to our grocers, was originally obtained over fifty years ago from the Hidatsa Indians. This, as it is much more tender and more quickly cooked and more easily digested than the common Navy or pea bean, is proving to be a strong competitor to the product of Michigan, New York, and California bean growers and may eventually force these growers to pay more attention to the quality of their product. The Hidatsa Red bean is of the same type and very similar to the Mexican Red variety, a bean grown in California for the chili

con carne trade. There is nothing to prevent these better flavored western beans from being grown in eastern territory, and in my own trials both the Idaho Great Northern No. 56 and the Hidatsa Red produced good crops in southern Michigan.

From the same aborigine sources are derived our earliest and hardiest garden vine fruits—squashes and pumpkins. The Fort Berthold pumpkin, the earliest variety, comes from the Mandan and Arikara tribes, and a close rival, the Omaha, from the Indians of that name. The squash list is even better, including the Mandan, "the very earliest squash," obtained from the Mandan Indians, a variety that will ripen anywhere, notably in the Montana mountains, where squashes have never been grown before." This variety has been used by Professor A. F. Yeager in a cross with the Table Queen to produce the Dakota variety, described as "much earlier and more prolific than Table Queen." A little more modern in time of origin, the Red Lodge Marrow is from the Italian of Red Lodge, Montana, where these settlers from the Old World have made a selection from their heirloom cocozelle of more than usual earliness and productivity. And if you have adverse conditions you can plant the Arikara, "the earliest large winter squash that will set fruit and outyield all others under drouth conditions."

Turn now from the bleak and rigorous climate and the strenuous struggle for survival of the wind-swept Dakotas and the stern New England mountains to the more hospitable clime of the deep South, and we find other types of local or heirloom vegetables, some of which are just beginning to achieve a wider range of appreciation. Here the green-fleshed and the large muskmelons—the big ones of fifteen to forty pounds, such as Hollybrook Luscious and Old Time Tennessee, too large, soft and breakable to enter into interstate commerce, retain their place as home garden and local market favorites.

From far down in the Mississippi delta country another heirloom vegetable is just emerging from the comparative obscurity of local cultivation. This is the Creole pea—a variety introduced by early French settlers in Louisiana over a hundred years ago. The Creole pea withstands severe heat and extreme cold, is resistant to root rot, mildew, and insect pests, and will survive where all other peas are killed. An early sixty-day pea, it is of the tall vine type (six to seven feet), does well in the North, and aside from its value as a garden pea for human consumption, is potentially a valuable forage and hay crop

for the Northern dairyman and stock farmer.

The influx of wartime workers from the South into northern shops and factories who brought with them their food habits and preferences, has served to introduce the edible cow peas, the "crowder" or black eye" peas to many northern markets. But still too many folks do not know the "crowders" (so named because the peas are crowded in the pod), and there is no good reason for the continued neglect of that old southern favorite the collards, a vitamin filled vegetable, nor for ignoring the roquette or rocket salad plant, a favorite culinary flavor herb of New Orleans.

Of course there is nothing necessarily regional or local about the occurrence and retention of family or neighborhood choice or heirloom vegetables—they may be found anywhere. There is the Pioneer Bachica bean and the Red Bottle or Torpedo onion of the Italians of California. And in Ohio some farmers continue to grow Blue Clarage field corn, a variety with slate-blue ears, in preference to the most golden product of the hybrid corn breeder's art, claiming their hogs are epicurean enough to always pick out and eat the blue ears first.

Certainly the continued cultivation of a local or family heirloom variety may be mistaken and unjustified. It may be retained just because the growers don't know any better, because they are not acquainted with better varieties, the product of modern plant breeding. But it is better than an even chance that where these heirloom varieties have survived for generations that they do have some feature or features to commend them. In the service of better plant breeding, research and exploration are just as much matters of the folkways of America as they are of the jungles of New Guinea or of the valleys of the Himalayas —so if you have a treasured vegetable variety—don't hide it under a bushel—but give it a chance to fill many bushels in the gardening world. You really may have something.

# Try Strawberries!

**Condensed from Eastern States Cooperator**

*W. T. Thies*

**Extension Horticulturist, Massachusetts State College**

ALTHOUGH only 1/40 of the farms in the United States are classed as fruit farms, they produce 5/6 of our national fruit crop. This suggests that fruit growing is a specialized business. Yet we find in the eastern states an occasional poultryman, dairyman, or vegetable grower who is operating a fruit enterprise as a sideline, with considerable success. The chances of success with an apple orchard on such a farm are less favorable than with a strawberry planting since the latter involves little if any spraying or dusting.

Strawberries require considerable hand labor. No one should attempt to grow this fruit unless favorable soil and enough labor at the right time are available. An inexperienced grower is likely to set strawberry plants on poorly prepared soil and then ask what kind of fertilizer should be used, instead of fitting the soil at least a year in advance. He may even attempt to produce a crop of berries by heavy fertilization in the spring of the bearing year. Such a practice cannot be too strongly condemned.

How many strawberries may one expect from an acre? The average for Massachusetts is less than 3000 quarts. One Massachusetts grower, however, actually harvested 12,000 quarts from an acre. But he did it by taking a year in advance to prepare the land. During that time he grew three cover crops, each of which was fertilized and plowed under. The soil was well supplied with organic matter, an important factor in a strawberry planting. A yield of from 5000 to 8000 quarts per acre is a reasonable goal. It is better to aim for a heavy yield on half an acre than to spread one's efforts over a larger area. The beginner should start in a small way and plant no more than he is able to handle properly.

(1) *Soil.* The ideal soil is fertile, well drained, retentive of moisture, and well supplied with organic matter. It is a waste of time to set plants on a poorly adapted soil. If the soil will grow a good crop of vegetables, flowers, or weeds, it has possibilities for strawberries.

(2) *Source of plants.* The best are none too good. Northern

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grown plants are preferred. Plants should be set while the weather is still cool and the soil well supplied with water. Care must be taken to prevent drying of roots. Roots begin to grow before weather conditions are favorable for top growth. Thus, plants which are set in late April or very early May have a chance to get established before top growth, with its demand for water, begins.

(3) *Varieties, Howard 17 or Premier* is still a favorite, particularly on lighter soils. *Catskill* is an excellent variety where soil conditions favor a strong plant growth. The planting may well include both varieties.

(4) *Planting systems.* Opinions vary as to the ideal spacing of strawberry plants. The rows should be at least 3.5 feet apart and preferably 4.0 to 4.5. Plants may be set two feet apart in a row. Many growers use the matted row system; others prefer the spaced runner system. The latter, of course, requires much more hand labor.

(5 *Weed control.* A clean bed will facilitate harvest and lessen the amount of rot.

(6) *Mulching.* "Putting the plants to bed for the winter" is very important. A mulch of straw applied about the time the ground freezes in November prevents deep freezing of the soil and consequent heaving of the plants. Mulching also helps to protect the blossoms to some extent against spring frosts and it helps to keep the berries clean.

Commercial strawberry growers seldom hold the planting over for a second year's crop. This means planting a new bed each year. Even though weeds have been well controlled, the second crop may be disappointing and the berries are likely to be smaller.

The leaves which a runner plant develops the first season determine the number and size of the berries it will produce the following June. The successful strawberry grower is therefore interested in growing vigorous runner plants the first season instead of trying to stimulate them into profitable production the following spring.

# A New Grain Crop for the Upper South

Condensed from The Southern Planter

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GRAIN sorghums have been an important crop in the dryer sections of the Southwestern United States for many years. The grain produced from them is almost as valuable in feeding rations as corn, and sorghums have long been recognized for their ability to withstand considerable periods of drought without serious reduction in yields.

Until comparatively recently, grain sorghums have not been considered as an important crop in the Upper South, as yields of the old types were considerably below those of corn. However, in recent years, dwarf strains of grain sorghums have been developed which may be harvested with small grain combines, thus reducing materially cost of production, and which yield better than the old standard types of Kaffir and milo. The shortage of labor during the war period suggested some trials with these new types of grain sorghums in comparison with corn as a source of home-grown grain to take the place of corn, or to supply additional grain on farms where labor could not be obtained to harvest the corn needed for the increased livestock population.

The results of these experiments have been extremely gratifying and show that grain sorghums may be produced profitably in Virginia, with less labor per acre than is required for corn. The sorghums adapted themselves well to the use of machinery.

Lands are plowed and prepared as for corn, and the sorghum seed are sown broadcast at the rates of 12 to 15 pounds to the acre, or planted in rows and cultivated with corn cultivators. Since these sorghums do not grow very high, they are not easily broken by cultivators, and close spacing prevents any considerable growth of weeds between the plants in the row. When sorghums are grown in rows, one cultivation with the smoothing harrow or rotary hoe, followed by two cultivations with the corn cultivator, spaced about two weeks apart, will usually be sufficient to insure a clean crop.

When the seed are fully mature

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and shell from the heads easily, they should be harvested with the combine and spread thinly where they can dry out easily. Where one wishes to feed the plants whole to livestock, they may be harvested with a small grain or corn binder and placed in shocks until thoroughly dry, and then stacked or stored in barns until needed. Except for poultry, the threshed grain is usually ground and substituted for corn, pound for pound, in feeding rations. It is considered best to feed grain sorghums in the early part of the feeding season, as they do not keep well in bulk when warm weather comes in late spring.

These grain sorghums should not be confused with sweet or syrup sorghums, as their stems contain no more sugar than corn stalks, and they are grown primarily for grain. However, the stalks may be used for forage and have about the same feeding value as corn stover. Where combines are used to harvest the grain, the fodder is best utilized by turning cattle into the fields to consume the residue. However, the fodder may be mowed and stored, if desired.

Where one is interested primarily in grain production, only the dwarf varieties should be used, as these may be harvested easily with grain combines. As a result of four years' testing at Blacksburg and one year's test at six other locations in Virginia, it appears that Wheatland Milo, Plainsman and Martin's Combine Milo are among the best dwarf grain sorghums for Virginia conditions. Of the three, Wheatland has been slightly more consistent in performance, but all three are good kinds. Hegari, a semi-dwarf kind, has also yielded well, but grows too tall for easy harvest with the combine. Of course, grain sorghums may be used for forage production, and excellent yields are obtained from varieties like Hegari. However, if sorghums are grown exclusively for dry forage or silage, the taller growing sweet sargos, such as Sugar Drip, Early Amber and Early Orange, are suggested.

A spacing test conducted at seven localities in the State last summer indicates clearly that for best grain yields, grain sorghums should be sown in rows wide enough to permit cultivation, and culitivated at least twice during the growing season. Rows spaced 3 feet apart with plants 4 to 6 inches apart in the row gave somewhat better results in grain yield than closer or wider spacing. However, from the standpoint of forage, yields were greater from broadcast seedings and close spaced rows.

The growing seasons for grain sorghums are slightly shorter than for standard varieties of corn. Approximately 125 days,

however, are required for full maturity of the crop. A good planting rule is to begin planting the sorghum crop as soon as corn planting has been completed. The fertilizer requirements for sorghums are about the same as for corn. The usual recommendation is 300 to 500 pounds of 3-12-6 or 4-12-4 fertilizer, at or just before planting, distributed with a fertilizer drill; followed by a side-dressing of the equivalent to 150 to 200 pounds of nitrate of soda in the form of some quickly available nitrogen carrier, just before the last cultivation.

Yields of sorghums, like other crops, vary with the season and soil productivity. In some years, at certain localities, the yield in pounds of grain to the acre has been equal to or greater than that of standard varieties of corn planted on adjacent plots. However, in all of our tests, the varieties mentioned in this article have yielded within 10 per cent of corn varieties included in the same test. With this differential a pound of grain sorghum may be produced as cheaply as a pound of corn with a smaller man labor requirement.

# The Sugar Bush Pays Off

**Condensed from The Michigan Farmer**

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To SOME people maple syrup is something to put on pancakes and maple sugar is something that makes certain pastries more delicious. To others these products and the sugar bush from which they come are a valuable source of income. Soil conservationists are interested in both angles because they usually have healthy appetites and because a good woodland frequently is the best use that can be made of certain land.

Foresters and farm economists in the north and northeast know that a good sugar bush is a potential economic asset on any farm. Specific dollars and cents returns, however, have not been available, or if available, were not set up in a form whereby the income could be compared to that received from other farming operations.

The records maintained on farm forestry projects have given the Soil Conservation Service an opportunity to summarize the cost accounts of 12 maple syrup producers in northeastern Ohio, northern Indiana, and southeastern Michigan. Three of the accounts covered 4 years of operation; 5 covered 2 years; and 4 but 1 year. All reflect the advantage of above-average syrup prices but to offset this, the 1945 season was one of the poorest in volume production that operators have ever experienced. This fact, combined with the high operating costs of the last few years, results in conservative net incomes.

Because of the wide variations in efficiency of operation and quality of timber, the average of any single group of farm accounts does not give an accurate idea of returns. For that reason, the following table presents the average annual income and expense of 3 groups of 4 operators, based on the net annual return per acre and designated as high, medium and low income woodlands. Thus a good maple woodland operated with reasonable efficiency should net the owner about $24 per acre annually. A poorer woods under less efficient management will return less than $5.

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Generally acceptable farm accounting procedures were used in keeping and summarizing the records. Income values for products used at home were credited in amounts equal to their cost if purchased by the farmer. Non-cash expense, which included the operator's or family labor, team, tractor or buzz saw operations, and the annual depreciation on equipment, were charged at currently going rates for comparable services. Cash expenses represent actual out-of-pocket costs as a result of the woods operation; similarly, cash income reflects actual returns from sales.

These accounts considered the going market value of the woodland acreage, and the rate of interest that currently can be derived from capital. Some may question the high valuation placed on woodland as well as the low rate (3%) of interest charged. Both are in keeping with present-day values. Although many accountants measure capital on original costs, such a procedure in the case of a farm woods having good salable timber, would not represent the true picture of its worth.

The accounts also take changes of inventory into consideration. In a well-managed farm woodland, however, there is no drastic change in inventory. The growth equals or exceeds the harvest. The records summarized cover woods that are under good management, hence there is no point in showing inventory changes.

The income for any timber sold on the stump is itemized separately in order to deduct it from the net income when computing the returns per hour of labor. Obviously, if a farmer sells stumpage with little effort on his part, his income for the time he spends in his woods should not be based on stumpage returns.

The average farmer in the high income group spent 368 hours per year on 30 acres of woods or 12.3 hours per acre. The medium income farmer spent 423 hours on 43 acres, or less than 10 hours per acre; while the low income producer spent but 389 hours, or less than 4 hours per acre annually. Conversely, the high income group hired but little outside labor, while the cash labor costs in the low group were double that spent by the operator and his family. That tends to prove what is generally recognized: A farmer cannot make money if he does not work for it. The sugar bush, the farm woods, and all other parts of the farm, produce in direct proportion to the effort and skill put into them.

The summary also reflects some interesting figures when comparing the labor utilization and the size of the woodland of

the 3 income groups. The average expenditures of labor in each group is approximately the same. On the other hand, net income is in inverse ratio to the area of the woodland. From that one might logically assume the amount of available labor is

**WOODLAND ACCOUNTS OF 12 MAPLE SYRUP PRODUCERS**

**Average per Year—1-4 Years of Operation**
**Ohio, Indiana, and Michigan**

| | Average of 4 High Income Woods | | Average of 4 Medium Income Woods | | Average of 4 Low Income Woods | |
|---|---|---|---|---|---|---|
| 1. Home Use Income Total | $ | 92.39 | | 151.87 | | 221.17 |
| (a) Posts | 12.50 | | | | .78 | |
| (b) Lumber | 8.30 | | 15.00 | | 40.22 | |
| (c) Fuel | 50.37 | | 129.37 | | 160.22 | |
| (d) Other | 21.22 | | 7.50 | | 19.95 | |
| 2. Income from Sales Total | $ | 1107.91 | | 788.25 | | 492.89 |
| (a) | ..... | | .... | | ..... | |
| (b) Logs and Lumber | 11.75 | | 13.77 | | 90.82 | |
| (c) Fuel and Other | 25.00 | | ..... | | 120.40 | |
| (d) Maple Syrup | 1071.16 | | 774.48 | | 281.67 | |
| 3. Stumpage Sales | $ | ..... | | 60.69 | | 239.82 |
| 4. Total Gross Income | $ | 1200.30 | | 1000.81 | | 1003.88 |
| 5. Non-Cash Expense Total | $ | 264.62 | | 269.19 | | 115.12 |
| (a) Labor | 174.06 | | 183.06 | | 48.69 | |
| (b) Team | 61.56 | | 53.62 | | 18.43 | |
| (c) Equipment Operation | ..... | | 6.26 | | 22.35 | |
| (d) Equipment Depreciation | 29.00 | | 26.25 | | 25.65 | |
| 6. Cash Expense Total | $ | 81.45 | | 83.55 | | 125.52 |
| (a) Labor | 10.12 | | 28.44 | | 97.25 | |
| (b) Tools and Equipment | ..... | | ..... | | 2.76 | |
| (c) Processing | 19.69 | | 16.12 | | 9.19 | |
| (d) Materials | 51.64 | | 38.99 | | 16.32 | |
| 7. Taxes | $ | 11.27 | | 40.94 | | 16.25 |
| 8. Interest @ 3% | $ | 118.50 | | 141.75 | | 256.80 |
| 9. Total Expense | $ | 475.84 | | 535.43 | | 513.69 |
| 10. Net Income | $ | 724.46 | | 465.38 | | 490.19 |
| 11. Area in Farm | | 136 A. | | 119 A. | | 657 A. |
| 12. Area in Managed Woods | | A. | | 43 A. | | 101 A. |
| 13. Capital Value, Woodland and Equipment | $ | 3950.00 | | 4725.00 | | 8560.00 |
| 14. Net Return per A. of Woods | $ | 24.15 | | 10.82 | | 4.85 |
| 15. Rate of Interest Earned on Capital | | 21.3% | | 12.9% | | 8.7% |
| 16. Return per Hour of Labor | $ | 2.47 | | 1.45 | | .89 |
| Hours of Labor | 368 | | 423 | | 389 | |

relatively stable, and when a farmer attempts to handle a greater acreage than his labor will permit he does so with a loss of efficiency and net income.

These figures indicate that if a farmer has a good woodland with 20% or more of it in sugar maple of tappable size, he has a good potential source of income. If he works in it efficiently every year and makes maple products, cuts posts, fuel, and logs, he can produce readily marketable products which will bring him an income per acre as good or better than he receives from any other farming operations.

# Production Records Are Vital to Swine Improvement

Condensed from American Hampshire Herdsman

*Prof. L. A. Weaver and Ralph Bogard of the University of Missouri Reach Significant Conclusions Through Records Covering a Four-Year Period*

FOR MANY years more efficient methods of pork production have been concerned primarily with better methods of feeding, management, and other environmental factors, and marked improvements have resulted.

To a lesser extent, consideration has been given to the selection of breeding animals and to breeding methods, and while progress has been made as a result of such studies, improvement has been somewhat limited because adequate production records have not always been available. Such records, kept by practical breeders as a basis for selection in improvement of swine, should not be under-estimated.

Some of the more important records which may be kept by practical swine breeders and used as a basis of selection of more efficient animals are concerned with productive characters such as prolificacy and suckling ability of the sow and rate and economy of gains of the pigs.

From observations in the University of Missouri's swine-breeding herd over a period of four years (1938-42), these four conclusions were developed:

1.—Within limits, an increase in size of litter does not result in a decrease in average weight per pig at weaning.

2.—There is a direct relationship between weight of pig at weaning, feedlot performance after weaning, and consequently, weight at 180 days of age.

3.—With larger litters there is less feed and overhead costs required to produce 100 pounds of marketable pork.

4.—Gilts selected from efficient producing sows inherit productive ability.

Although birth weight of pigs in large litters may not be as great as those in litters of smaller size, strong pigs of moderate to heavy weights may be produced in large litters. The percentage of pigs raised in the University's herd was greatest in small lit-

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ters, but in general, the number of pigs weaned was greater for litters of ten or more.

An increase in the number of pigs weaned per litter increased the total litter weight and did not necessarily lessen the average weight per pig at weaning.

A litter of more than ten pigs may result in reduced milk supply per pig, and thus, a smaller weaning weight per pig, but when very few pigs are weaned per litter, they are usually light in weight. The stimulation by nursing of only one or two pigs may not be sufficient to cause a heavy milk flow.

Pigs that were large and vigorous at birth grew more rapidly and weighed more at weaning time than pigs with light birth weights. One pound advantage in size of pig at birth resulted in about a seven-pound advantage at weaning. The gain per day was directly associated with the size of pig at birth.

Small weak pigs have little chance of survival, and may be a further liability by causing restlessness of the sow and increasing the chances of her overlaying other pigs in the litter. For this reason, some successful operators destroy very small pigs at birth, particularly if there is a satisfactory number of larger pigs in the litter.

In our study no large pigs were farrowed dead, while many of the small pigs were dead at birth. Very large pigs, however, have as great mortality as pigs weighing the average three pounds at birth. The advantage of pigs heavier than this is in growth rather than survival.

Rate of growth from weaning until market is important because pigs that grow fast reduce labor, risk, and similar expenses. The size of the pig at weaning reflects the capacity of the pig to grow and the ability of the sow to produce a liberal supply of milk.

Pigs which have a light weight when weaned are at a disadvantage because while they have practically the same cost of production as larger pigs at weaning, they must obviously gain more to reach the same market weight.

Pigs weighing about 17 pounds at weaning gained about 1.4 pounds per day while 50 pound pigs gained 1.6 pounds per day.

The heaviest pigs at weaning reached 254 pounds at 6 months while the smallest pigs at weaning weighed only 189 pounds. The smallest pigs in this study require 54 days longer to reach the same market weight as the largest pigs at weaning.

Much higher prices per cwt. must be gotten for pigs from poor sows to cover feed costs of fat hogs.

When sows and gilts are maintained under good conditions of

feeding, sanitation, and management, productivity is largely a reflection of ability to produce profitably. The productivity of a sow may not be the same for each farrowing but on production records is an indication of what may be expected with succeeding litters.

The productivity of the sow is important in selecting gilts. Results of a dam-daughter comparison showed quite a close agreement in the productivity of the daughters with that of their dams. Inferior producing dams never produced daughters which rated better than medium and 86.4 percent of their daughters were inferior.

Medium producing sows produced a large number of medium producing daughters, 52.2 percent, with a greater proportion of the offspring not falling in the medium class, being inferior rather than good.

The good sows produced more than twice as many good producing daughters as did the medium producing sows.

The boar also transmits factors which are concerned in the productivity of his gilts, and he should, therefore, be selected from the better producing sows.

Here is the way to rate them for your own productivity records:

*Excellent*—sows which produce at least 8 pigs which weigh not less than 400 pounds per litter at weaning (56 days).

*Superior*—sows which produce at least 7 pigs that weigh not less than 325 pounds when weaned.

*Good*—sows which produce at least 6 pigs that weigh not less than 250 pounds at weaning.

*Medium*—sows which produce at least 5 pigs that weight not less than 175 pounds at weaning.

*Inferior*—sows which produce less than 5 pigs per litter or litter which weighs less than 175 pounds when weaned.

The number of teats and how they are spaced is important in parent selection. Few teats or those improperly spaced result in a reduced milk supply.

Sometimes the nipple is not normally developed, but turns back into the surrounding tissues rather than protruding outward. Such nipples cannot be nursed by pigs. In all cases of inverted nipples observed, none have been functional. Though they decrease the total milk production, they may not cause a lowered milk flow from the individual normal teat.

Few hogs have inverted nipples, but the abnormality may occur in all breeds of swine. Observations demonstrate a complex heredity basis. Inverted nipples can be detected in early life, usually at birth, and are positively discernable when gilts

are old enough to breed. The boar can pass the undesirable inheritance on to his offspring.

Mastitis (caked udder), is another serious abnormality the susceptibility to which is inherited in a complicated manner. Therefore, it may be desirable to discard from the breeding herd not only those sows with mastitis, but their offspring and any sow or boar whose daughter or sister develops the disease.

Evidence indicated that the fertility of the boar is reflected in the litter size as well as in the percentage of sows that settle. There is a direct relationship between the quality of the semen and the length of time the sperm are capable of fertilizing the eggs.

Gilts bred twice during the same heat period produced 7.4 pigs per litter, while those bred once produced 5.1.

When stored semen was used for artificial breeding, two inseminations 12 hours apart gave more than twice the percentage of conception obtained with one insemination.

This advantage in allowing two services, however, would not always hold true. Breeding or insemination more than once is more important when boars of lower fertility or stored semen are used. It is important not to overwork your boar. If only one service is given better results may be expected if it occurs near the end rather than at the beginning of the heat period.

## FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

**A Living from Bees** — By Frank C. Pellett, Field Editor of American Bee Journal. Orange Judd Publishing Co., Inc. $2.00.

**America's Garden Book** — By Louise Bush-Brown and James Bush-Brown. Charles Scribner's Sons. $3.50.

**An Agricultural Testament**—By Sir Albert Howard, C.I.E., M.A., former Director, Institute of Plant Industry, Indore. Oxford Univ. Press. $3.50.

**Animal Sanitation and Disease Control**—By Dr. R. R. Dykstra, Dean of the School of Veterinary Medicine, Kansas State College. The Interstate Printers and Publishers. $2.85.

**Beef Cattle** — By Roscoe R. Snapp, Asso. Prof. Animal Husbandry, Univ. of Illinois. John Wiley & Sons, Inc. $4.00.

**Beef Cattle Production in the South**—By D. W. Williams, Head, Department of Animal Husbandry, A. & M. College of Texas, College Station, Texas. The Interstate Printers & Publishers. $2.00.

**Breeds of Livestock in America**—By Henry W. Vaughan, formerly Prof. of Animal Husbandry, Iowa State College. College Book Co. $3.75.

**Dairy Cattle Feeding and Management**—3rd Edition—By H. O. Henderson, Prof. of Dairy Husbandry, W. Va. Univ., Carl W. Larson and Fred S. Putney. John Wiley & Sons, Inc. $4.00

**Dairy Science**—By W. E. Petersen. Ph.D., Assoc. Prof. Dairy Husbandry, Univ. of Minn. By R. W. Gregory. J. B. Lippincott Co . $4.00.

**Diseases and Parasites of Poultry** — By Edgar Hugh Barger, D.V.M., Berkeley, Calif., and L. E. Card, Ph.D., Prof. of Poultry Husbandry, Univ. of Illinois. Lea & Febiger. 3rd Edition (1943). $3.75.

**Farmers of the World**—The Development of Agri. Extension—edited by Edmund deS. Brunner, I. T. Sanders, Douglas Ensminger. Columbia Univ. Press (1945). $2.50.

**Feeds and Feeding**—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.

**Farm Management**—By Robert R. Hudelson. The Macmillan Co. $2.00.

**Farm Management and Marketing** — By V. B. Hart, M. C. Bond, L. C. Cunningham, all of N. Y. State College of Agriculture, Cornell University. Publishers: John Wiley & Sons, Inc. $2.75.

**Forestry in Farm Management**—By R. H. Westveld and Ralph H. Peck. John Wiley & Sons, Inc. $3.00.

**Grow Your Own Fruit**—By M. G. Kains, formerly with U. S. Dept. of Agriculture; Professor of Horticulture, Pennsylvania State College. Greenberg, Publisher. $3.50.

**Growing Tree and Small Fruits**—By H. B. Knapp, Director, State Institute of Applied Agriculture, Farmingdale, Long Island, N. Y., and E. C. Auchter, Chief, Bureau of Plant Industry, U. S. D. A. John Wiley & Sons. $2.75.

**Judging Dairy Cattle**—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.

**Livestock Production**—By Walter H. Peters, Chief, Div. of Animal and Poultry Husbandry, Univ. of Minn. McGraw-Hill Book Co., Inc. $3.50.

**Livestock Judging Handbook — By Julius E. Nordby and W. Malcolm Beeson, Ph.D., Asst. Professors Animal Husb., Univ. Idaho. The Interstate Printers. $2.60.**

**Natural Principles of Land Use**—By Edward H. Graham,, Chief of the Biology Division of the Soil Conservation Service. Oxford University Press. 275 pages. $3.50.

**Pay Dirt**—Farming and Gardening with Composts — By J. I. Rodale. Devin-Adair Co. (1945). $3.00.

**Palestine—Land of Promise** — By Walter Clay Lowdermilk, assistant chief of the Soil Conservation Service. Harper & Brothers (1945). $2.50.

**Pleasant Valley** — By Louis Bromfield, author, farmer, soil conservationist. Harper & Brothers. $3.00.

**Poultry**—By A. R. Winter, Asst. Prof. Poultry Husbandry, Ohio State Univ., and E. M. Funk, Asst. Prof. Poultry Husbandry, Mo. State Univ. J. B. Lippincott Co. $5.00.

**Practical Farming for the South** — By Benjamin F. Bullock, now Prof. Rural Education, Atlanta Univ. Univ. of North Carolina Press. $2.50

**Profitable Poultry Keeping**—By H. Clyde Knandel, Head, Dept. Poultry Husb., Penn State College. Orange Judd Publishing Co., Inc. $3.00.

**Pork Production**—By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. The Macmillan Co. $3.75.

**Repairing Farm Machinery**—By Ivan G. Morrison, Asst. Professor Agri. Education, Purdue Univ. The Interstate Printers & Publishers. $1.80.

**Seaman A. Knapp**—Schoolmaster of American Agriculture—By Joseph C. Bailey, Dept. History and Social Science, Hunter College. Columbia University Press. 1945. $3.25.

**The Farm Primer**—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

**The American Land—Its History and Its Uses** — By William R. Van Dersal, biologist in the U. S. D. A. Oxford University Press. $3.75.

**Successful Poultry Management**—By Morley A. Jull, Professor and Head of Poultry Dept., Univ. of Maryland. McGraw-Hill Book Co., Inc. $3.00.

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**The Farm Primer**—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

**Weeds of Lawn and Garden** — By John M. Fogg, Jr., Prof. of Botany, Univ. of Penna. University of Pennsylvania Press (1945). $2.50.

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